

THE IRON AGE

THURSDAY, OCTOBER 15, 1891.

Defending New York Harbor.

The Engineering Department of the United States Army is perfecting the last details of plans to complete the defenses of New York. These plans are for a great fort of modern mortar batteries at Plumb Island, to be constructed facing the ocean and defending the broad gateway of the harbor.

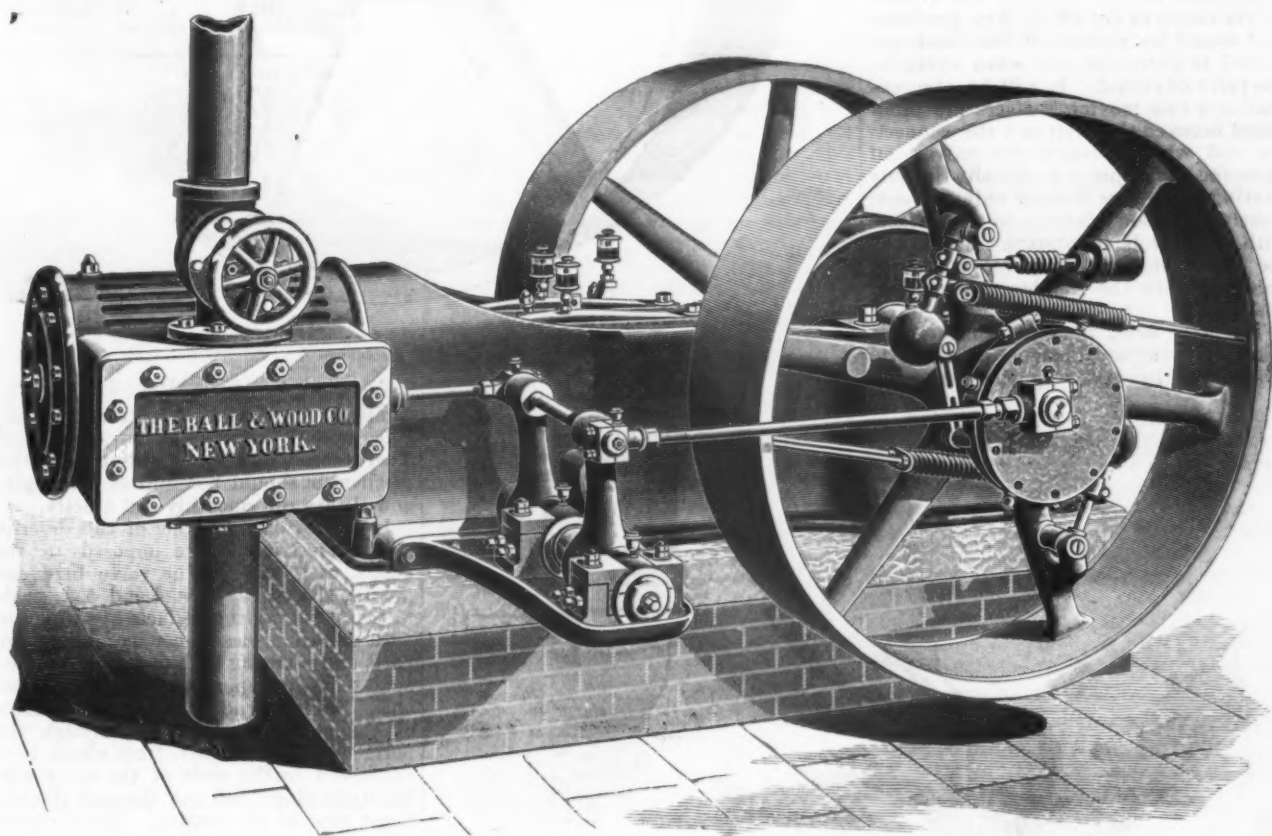
The Plumb Island mortar batteries are to be arranged in two fortifications of earthworks standing side by side and facing the ocean at a southwest angle. Each fort is to be 600 by 400 feet, according to Gen. Henry C. Abbott, president of the Board of Engineers, in whose office the plans have been prepared. The ramparts

The 32 great guns for the two Plumb Island batteries are to be of the new pattern of 12-inch mortars known as howitzers, of which successful tests have recently been made at Sandy Hook. They are breech-loading, and constructed on the built-up plan, steel lined, rifle bored and steel hooped. They are much longer than the old pattern of mortar, and are capable of extreme accuracy in firing. The projectile for one of these monster cannons, which, dropped on the deck of the best armored ironclad in existence, would pierce the entire ship, is of solid bulk of steel, 3 feet long, weighing 625 pounds and costing \$300. Eighty pounds of powder will drive this large projectile 8 miles. The gun will also

The Ball Automatic Cut Off Engines.

Last week the Ball & Wood Co. of 15 Cortlandt street, New York City, finished the first engine built at their new works at Elizabethport, N. J. It is a simple engine, similar to the one of which an engraving is here presented, having a cylinder diameter of 15 inches and a stroke of 16 inches. It will be placed in the Trenton (N. J.) State House.

The Ball Automatic Cut Off Engine was introduced in 1882 and attracted attention chiefly because of its novel system of regulation, in which the governor performed the functions of a dynamometer, and this "weighing of the load" became one of the governing forces. This was the first en-



THE BALL AUTOMATIC CUT OFF ENGINES.

of the forts are to be 35 feet above ebb tide, and the guns will rest on a body of cement raised 10 feet above low water.

The interior of each fort is to be divided into four pits, each containing four of those terrible engines of destruction—12-inch howitzers. The guns will be fired out of a great well, as the earth walls of the fort will rise 25 feet above the level on which the cannons are operated. The mortars will thus be entirely invisible from the ocean. In the deep pits the guns will be perfectly protected from the impact of the shot thrown by the enemy, as the mounds of earth forming the ramparts are to be of a thickness impenetrable by any known projectile. Between the pits will be storage magazines for powder, protected by masonry and earth, and there are to be extensive magazines for high explosives located at some distance from the batteries. The powder magazines for each battery will hold 100 tons. In the rear the two forts will not be parquettied, but will be left open.

throw shells containing high explosives. By this means it can drop enough nitroglycerine on a ship's deck to scatter an ironclad into 10,000 pieces.

The census bulletin just issued giving the population of the State of New York by minor civil divisions shows in a striking way the tendency of large towns and cities to attract to themselves the rural population. Under the census of 1880 the population returned for the State was 5,082,871; under the census of 1890 the population returned was 5,997,853, an increase of 914,982, or 18 per cent., during the decade. During the same decade the inhabitants of cities and towns numbering over 4000 people increased 38.71 per cent. In 1880 there were 60 cities and villages having a population of 4000 or more. These places had an aggregate population of 2,743,632. Under the present census there are 84 cities and villages having a population of 4000 or more, with an aggregate population of 3,805,577.

gine offered for sale under an ironclad contract to forfeit the engine if it could not be made to fully hold to speed under full load. In 1880, F. H. Ball, the inventor of this engine, discovered a method of obtaining the desired result on an entirely different theory, and as the new device presented fewer mechanical difficulties in large engines and showed more correct performance under changes of boiler pressure, the weighing of the load device was entirely superseded by the later construction which, with the latest modifications, is illustrated in Figs. 2 and 3. The theory of this governor may be superficially described as a peculiar balancing of the centrifugal and centripetal forces, represented respectively by the swinging weights and the long springs. The latter are supplemented by the short spring having on its base the piston of a fluid dash pot. The hub of the governor wheel is shown with the eccentric A bolted securely to its outer end, thus becoming practically a part of the hub. This eccentric is provided with

an eccentric strap, B, made in halves and held in place on the eccentric by a flange on one side and the plate C bolted to the other side, as shown in the figure.

The governor weights are connected by links D to studs in the side of eccentric strap, so that the strap and plate C are turned slightly around the eccentric by the radial movement of the weights. This plate C carries a crank pin, E, which, through the medium of a connecting rod, actuates the valve. The radial movement of the weights is thus made to turn the plate C around its center, which is eccentric to the shaft, and the crank pin E is thus moved through the arc of a circle whose center is the center of the plate, and the various points of cut off are thus obtained. The curved path of the crank pin is made to give almost a constant lead to the valve until a very early cut off is reached, when the lead rapidly disappears and prevents the engine from running away.

A much better indicator card, with earlier points of cut off, is thus produced that would be possible if the crank pin moved in a straight line when changing the point of cut off. It will be observed that only two moving surfaces are interposed between the shaft and the connecting rod which actuates the valve. Of these the crank pin is practically the only wearing surface, as it is the only one constantly in motion relatively to the surfaces with which it is in contact. The other, the eccentric strap, only moves on the eccentric when the weights change their position.

The wear here, if appreciable, can be taken up in the usual manner for eccentric straps, and by removing the plate and

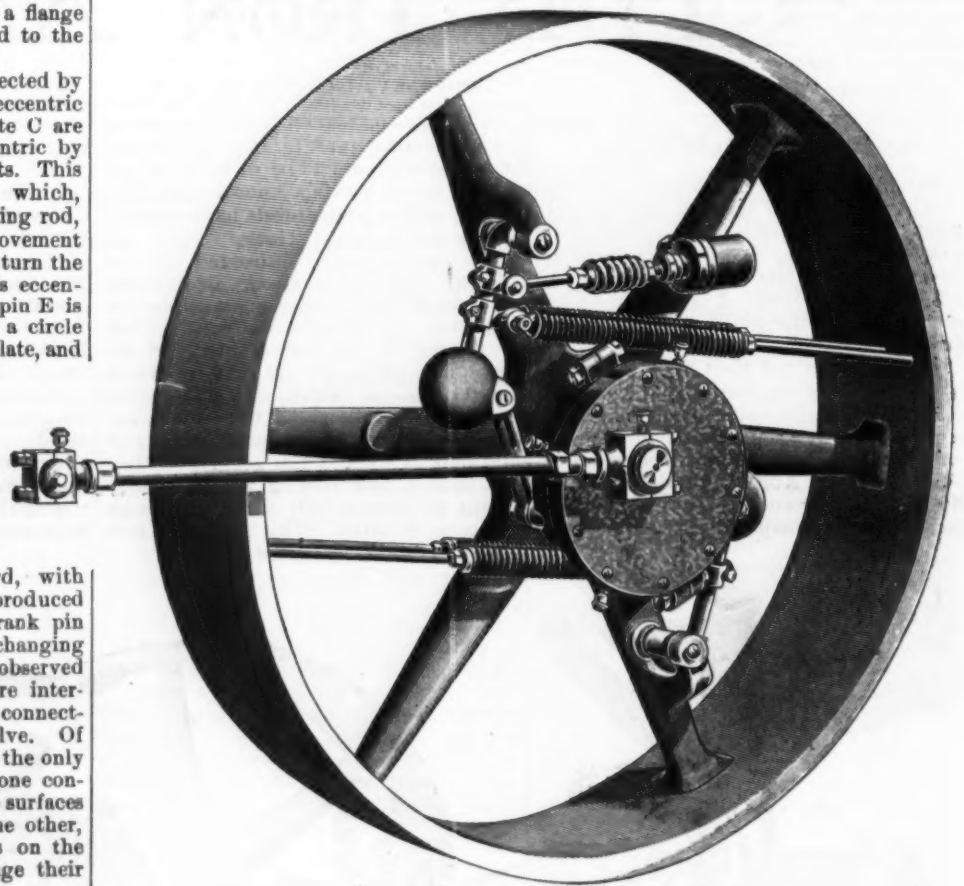


Fig. 2.—The Governor.

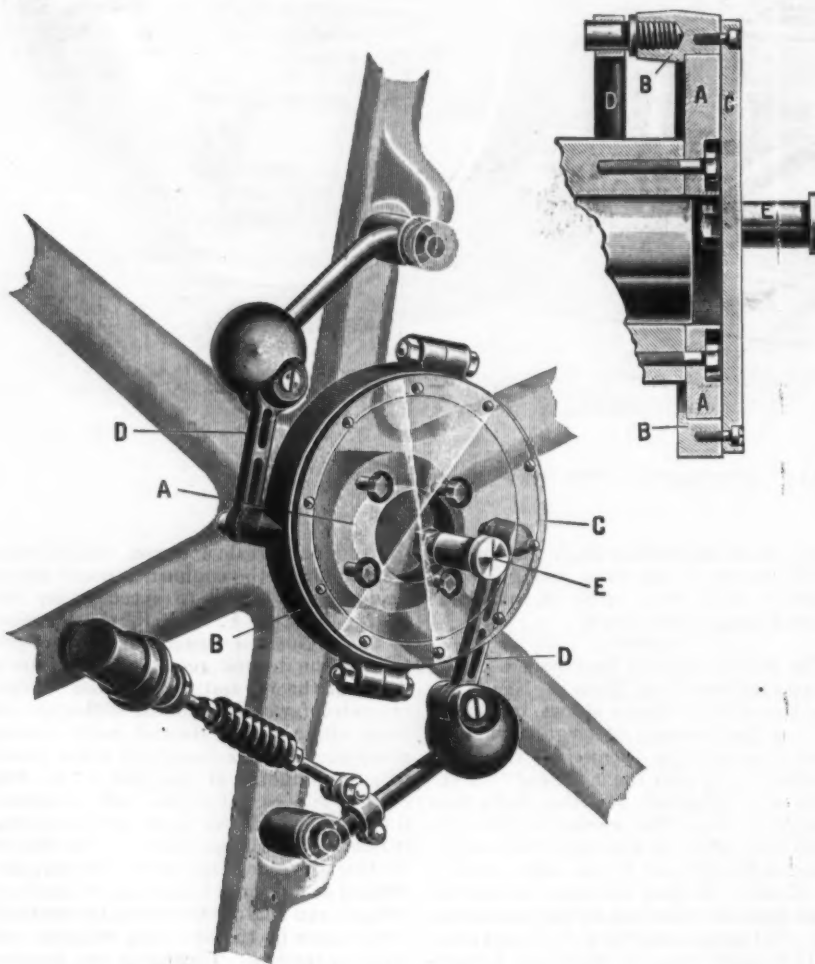


Fig. 3.—Details of Governor.

THE BALL AUTOMATIC CUT OFF ENGINES.

scraping the side of eccentric strap any side motion can always be eliminated. There seems to be no reason why this mechanism should not outlast the engine and always run smoothly and quietly.

In the use of a governor of this description no restrictions are imposed in the choice of a valve. The valve here employed, shown in Figs. 4 and 5, is made in two parts, having its faces opposite, and with telescopic sleeves connecting the two parts and allowing each face to be pressed against its corresponding seat in the steam chest. Steam is admitted to the interior of the sleeves and thence through the ports into the cylinder, from which it is exhausted by the ends of the valve into the steam chest, and out through the exhaust pipe at the bottom. The diameter of these sleeves determines the amount of pressure with which each part of the valve is held to its seat. A judicious choice secures just enough pressure for good contact, and not enough to make unnecessary friction and wear.

These features are embodied in all the styles of engines built by the Ball & Wood Company, and are the outgrowth of long and intimate acquaintance with steam-engine construction. The company also build tandem, cross and vertical compound and triple-expansion engines. The general form of the latter is that of a double engine. The low-pressure cylinder is divided between two cylinders of moderate size, whose combined capacity represents the actual low-pressure cylinder. These divided cylinders are placed side by side next the frame, and tandem with one is the high-pressure and with the other the medium-pressure cylinder.

The *Cleveland Iron Trade Review* says: "Importations of cotton ties from England have entirely ceased. . . . In July, 1890, we imported of 'hoops or ties for baling purposes, barrel hoops and hoop or band iron or steel, flared, splayed or punched,' 9,215,082 pounds, valued at

\$134,499. During the seven months ending July 31, 1890, we imported 16,392,920 pounds, valued at \$242,426. No importations whatever have been made during the past seven months."

A Factor of Safety.

Although the term "Factor of Safety" was originally adopted as a technical expression by civil and architectural engineers, it has, by imperceptible degrees, become almost universally used in connection with all branches of constructive engineering. It may be defined as a numerical expression of the value or that percentage of the ultimate or breaking strain,

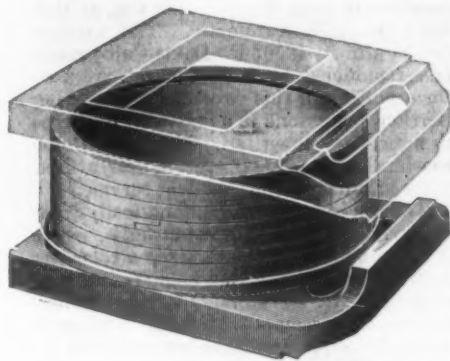


Fig. 4.—The Valve.

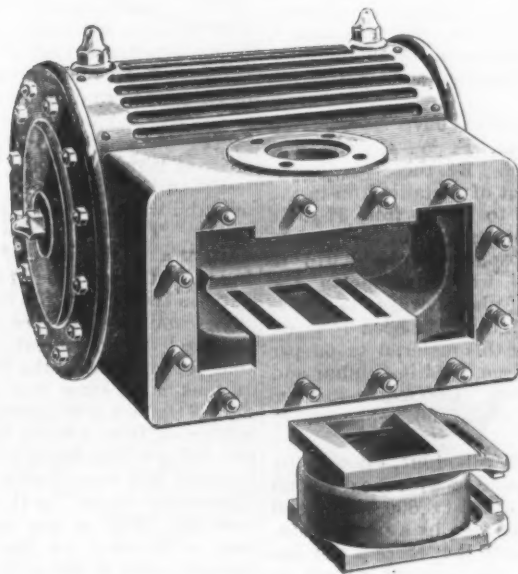


Fig. 5.—The Valve and Steam Chest.

THE BALL AUTOMATIC CUT OFF ENGINES.

of the material, which may be safely supported by the different elements or members entering into the construction of a building, bridge, machine or other structure subjected to such strains. Thus, a "factor of safety of 4" means 25 per cent. of the breaking strain; 5, 20 per cent.; 8, 12½ per cent., &c.

Unquestionably one of the most important of the multifarious functions of the engineer is that of determining what this number should be. It is essentially a matter of judgment, dependent solely on the experience and professional skill of the individual. Since the safety of life and property may depend upon its correctness, it becomes one of the gravest responsibilities possible to be voluntarily assumed.

What, for instance, can be conceived more terrible in its effects than the collapse of a large dwelling, manufacturing or office building; the fall of a railway

bridge or breakage of a rail under the strain of a rapidly-moving passenger train; the explosion of a boiler on a steamer out of reach of the shore? In such accidents as these, the destruction of possibly thousands of dollars worth of property, becomes a matter of relatively little importance as compared with the wholesale destruction of human life, which is the almost inevitable consequence. And yet the daily papers tell us of the continual occurrence of just such accidents; and although from their very frequency they may fail to attract more than passing attention, unless of an unusually appalling character, the fact remains that the loss of even a single life entails upon some one a terrible load of responsibility. If the cause of the breakage leading to such results may be traced to the careless or ignorant use of the all-important factor of safety in originally designing the construction, to whom does this responsibility belong if not to the engineer? Therefore the engineer becomes another, or, in fact, the factor of safety, for to him is entrusted the problem, and of his skill the factor of safety is the creation.

By none will the truth of this assertion be more promptly conceded than by the really competent and conscientious engineer. There are many instances on record in which this feeling of responsibility for disaster caused by the failure of their work has driven such men to insanity or suicide, and, in not a few of these, subsequent investigation has shown the cause

In sharp contrast to the former class is the man who "knows it all." He also is engaged in engineering pursuits. But he sneers at science, says "theory and practice don't always agree," despises "book engineers" and works by "rule of thumb;" glorying in the thought (and in the very frequent expression of it) that "he is a practical man and didn't need to learn his business out of books." This man, if designing a machine, building or what not, will consult his 2-foot rule, and with his two thumb nails moving back and forth on the graduations, will finally come to a decision and "guess he'll make that rod of 2-inch iron," or "that plate ¼ inch thick;" and it is so ordered. He is totally and sometimes willfully oblivious to the fact that there are very simple rules and data which would enable him to calculate instead of guess what the size should be, provided his boasted "practical" knowledge and experience of the physical properties of the different forms as well as kinds of material is adequate to the occasion. He has then but to decide as to the proper factor of safety, and the strength of his construction becomes a known quantity—that is, the safe though not necessarily the maximum strength. But he has no use for formulæ, tables, nor calculations, nor for the factor of safety; though why there should be any more necessity for accurate measurements in executing the work than in designing it, for using his foot rule and tape measure than his mathematical rules and data, would puzzle a logical mind to determine. Surely it cannot be any more important that the individual members of the construction should be of dimensions which will admit of their being properly assembled, than that, as a whole, they should possess sufficient strength to render them safe to use for the purpose for which the construction was designed. If he wished to truss a 20-foot beam, to increase its capacity 25,000 pounds, it would seem to be quite as foolish to use a rod of proper length, 1 inch diameter, when 2 inch was required, as it would be to try to make one of proper diameter of 10 feet length answer the purpose for the given span.

By the foregoing it is not by any means intended to convey the idea that only the highly educated are fit to be intrusted with work of this character. On the contrary, there are many among the ablest engineers in the profession whose early advantages were of the least, and yet they have attained to deservedly high reputation by their skill through natural ability alone. But it may be safely asserted that they have been, without exception, men of the quality of intellect we have described, and that, before they became thus proficient, the necessary technical education has been acquired against any and all obstacles.

On the other hand, neither does it follow that, because a man may have a thorough technical and general scientific education, he will make a competent engineer. He has the formulæ at his finger ends; knows the strength of material; can work out problems involving the use of the higher mathematics, and in all respects, save one, possesses the requisite qualifications of an engineer. But he lacks the judgment necessary to enable him to correctly determine his factor of safety, without which all of his other knowledge is, not useless, but positively dangerous; it is like an arch with the keystone left out. Or, it may be that, while possessing the judgment, he is deficient in wisdom to follow it, and allows his desire to reduce cost, or some other motive, to tempt him into reducing his factor of safety below the number dictated by his judgment, and deliberately taking risks involving not only the safety of his professional reputation, but that of the property and lives of others who were not consulted, nor had any voice as to whether or not they were

to have been distinctly due to other than constructive faults

But there are engineers and so-called engineers. The former, as a rule, men of more than average intellectual caliber, whose naturally analytical habit of thought leads them instinctively to consider the relation between cause and effect. To such—even though not originally educated for the profession—the necessity for a general understanding of theoretical and applied science becomes at once apparent as the very basis of the technical information required to enable them to follow this occupation. Such men, and only such, are fit material of which to make engineers. And the greater their attainments, from study and practical experience, the more they are able to realize how exceedingly limited is their knowledge, as compared with what there is still before them unlearned.

willing to share the risk. In other words, he takes the risk at other people's expense. We are not sure that this character of incompetency—for such it undoubtedly is—may not be considered as the most dangerous of all; and, that it exists to a serious extent, is beyond question. It is due to the active competition for the securing of contracts, in which the generally satisfactory design, costing the least money, is the one usually sure of acceptance. This applies more particularly to architectural engineering, which of late years has become of the greatest importance as to magnitude of operations, owing to the immense number of large buildings continually being erected; and in no class of work could the risk be more inexcusable, nor the results more appalling in case of disaster.

Of course it does not follow that because the strength is insufficient to insure safety, the structure must inevitably give way. It was the "last straw that broke the camel's back;" so in testing material up to its breaking strength, it bears to within an infinitesimal amount the strain which finally produces rupture. An overloaded column, wall or girder will not give way until the breaking strain is fully reached, but the elastic limit of the material once passed, the danger becomes imminent—the least unusual jar, vibration or increase of load in any manner being liable to produce rupture. Cases might be cited, *ad infinitum*, in illustration of this fact, where buildings, bridges and other structures have given way, when under no perceptible increase of the ordinary load, and upon investigation as to causes of the accident, which naturally followed, it would be discovered that the ordinary load was close to the breaking limit. It not unfrequently happens that a building which was properly designed to bear the strains due to the purpose originally intended, may be wrecked by a criminal carelessness in overloading it many times beyond what was contemplated in its design. This, of course, is no fault of the engineer, although he may possibly have to bear the blame, at least until investigation shall have exonerated him, which is by no means a certainty, as some can testify to their sorrow. As to the different points to be considered in determining the factor of safety, their name is legion. The chemical and physical properties of materials, the shape and probable condition of comparative soundness of the various members, uniformity or variability of conditions affecting the strains, &c., are some of the most important points, but there are others which, though quite as important, are not so apparent, and are more easily overlooked. It is the consideration of these multifarious features, overlooking none, and giving to each its correct relative as well as individual importance to enable him to arrive at its true value, which constitutes the engineer "a," if not "the" factor of safety.

Under the beneficent rule of President Diaz Mexico continues to prosper. The revenues of the country have steadily increased during the last six years and for 1891 the total is estimated at \$41,400,000. The debt now consists of \$52,500,000 external 6 per cent. bonds; \$30,000,000 of 6 per cent. bonds issued for railway subsidies, and \$24,000,000 internal bonds bearing 8 per cent. interest. The Government is also responsible for \$6,500,000 bonds of the Tehuantepec Railroad and \$2,500,000 6 per cent. silver bonds of the Monterey Railroad. On the total, interest of about \$6,250,000 a year is required. With the prosperity indicated by the growth of exports of home produce there has been a rapid increase in the income of the nation.

Magnetic Ore Concentration.*

BY W. H. HOFFMAN, M.E., CROTON MAGNETIC IRON MINES, N. Y.

The writer does not claim a right to discuss this subject as a furnaceman or user of iron ore in this new form. His efforts have been confined to mining, preparing and separating the magnetic ore from the gangue. Two years' experience in experimenting and another two years in producing concentrates on a commercial scale have led me to believe that the new trade of making concentrates must be well learned in all of its details. If there have been any partial failures in this most useful branch of the iron business, the failures have been caused chiefly by inexperience or lack of patience. Although I have, within the past five years, constructed machinery for water jigging and wet magnetic separation, I shall only speak of the dry magnetic process here.

Three years ago I was engaged by J. D. Cheever, the lessee of the Croton Magnetic Iron Mines at Brewster, N. Y., to adapt an old water jigging mill to the magnetic process. The ore to be treated is described by Messrs John Birkinbine and W. B. Kunhardt in a late report on the Croton Magnetic Iron Mines, as consisting of compact, moderately fine-grained magnetite in a gangue composed mainly of quartz and hornblend, besides feldspar, apatite and mica, and more or less pyrite and pyrrhotite, and they say "it is highly satisfactory that the grain of the ore permits a fair disintegration of its constituents by crushing it to pass a 12-mesh screen, inasmuch as a finer mineralization would increase the cost of concentration, as hereafter described."

Similar descriptions have been given Emerson McMillan, F. W. Gordon and Prof. N. S. Shaler. By these gentlemen the average amount of metallic iron in the ore beds is stated to range from 37 to 42 per cent., the average sulphur from 1.7 to 2.2 and the phosphorus from 0.070 to 0.426. Practical work has shown the average amount of phosphorus to be 0.232. Since May 1, 1891, we have been roasting and concentrating this material to 68 per cent. in metallic iron, 0.44 in sulphur and 0.036 in phosphorus. Previous to this the concentrates ran about 66 per cent. in iron.

Up to September 1, 1891, opening by drifting and prospecting with the diamond drill has exposed at least 8,000,000 tons of ore, while it can be seen by a fair examination of the property that there is not less than three times this amount of ore in these mines, and this estimate does not include the mining rights owned personally by J. D. Cheever.

Before the old water jigging mill was erected, some eight years ago, the product of these mines was sorted to remove the more sulphury ore, and was shipped directly to furnaces making foundry irons. In order to meet the requirements of purchasers the mining company were obliged to reject, in clobbering, 2½ tons to get 1 ton of shipping ore containing 51 per cent. of metallic iron and not more than 1 per cent. in sulphur. About 50,000 tons of this class of ore was shipped from these mines. The old dumps from this sorting are now being crushed and separated by the new process.

Commercial success in concentrating any ore includes economical mining, preparation and separation; but in the Croton ore the presence of sulphur calls for very economical roasting as well as economy in all the other processes. The cheap roasting of the ore of the Croton Mine, which contains about 2 per cent. of sulphur, was

really one of the first problems encountered in reclaiming that property, and was really as important a factor as the concentration.

A series of experiments was made to determine the best size for economical roasting, and as the end of three months a size that would pass through a 2½ inch ring was adopted as giving the most rapid work for the quantity of fuel consumed. Crude Lima oil is used for roasting. Through experiments conducted by our general foreman, T. Blass, we found the average consumption of fuel oil to be 3.75 gallons; but by enlarging the combustion chambers we have reduced this amount to a little over 3.6 gallons per ton of raw ore. The cost of the oil is 2½ cents per gallon, making a fuel cost of 8½ cents per ton of raw ore. The labor of filling and discharging amounts to only 3 cents per ton, as this work is largely automatic. The average temperature is 1250° F. Davis-Colby roasters, remodeled to burn fuel oil, are used for a portion of this work, the remaining portion being done in a roaster of new type designed by the writer. The Davis-Colby roasters have been in operation nearly three years and have done excellent service.

The ore is conveyed automatically from the roasters to the Sturtevant mills, where it is ground to 12-mesh size, all coarser material from the screens being returned to these mills by elevators. Barring the numerous experiments with various types of magnetic separators, the experiments in crushing have been the most elaborate. Nearly all the best-known methods of grinding ores have been tried at the Croton Mines during the past three years. Some of these machines have been tested for a year or more, but about 15 months ago we became thoroughly satisfied that the Sturtevant mill was far superior to any other machine for grinding iron ores.

The screen-block openings in the Sturtevant mills are ¼ inch wide, and the coarsest material passing through them is less than ⅛ inch thick, while the finest material would be rejected by a 60-mesh screen. The ore enters the Sturtevant mills at a temperature of about 350°, being cooled from about 1200° by a water bath on its way up the conveyor. Under these conditions the ore is quite friable, and we have no difficulty in grinding 22 tons per hour with the 20-inch mill and 16 tons in the same time with the 15-inch mill. One set of Sturtevant-mill bushings will grind from 4000 to 6000 tons of ore, according to the depth of the chill in the bushing, the cost of each set being \$16. The screen blocks for this amount of ore cost \$9. This is less than one-half the cost of renewal on any other machine formerly used at our mill. At 22 tons per hour the 20-inch mill requires 94 horsepower to drive it, but it will be remembered that the product is finished on these mills. The 15-inch mill requires 70 horsepower.

The ground ore is elevated from the discharging nozzles of the Sturtevant mills to the several screens, covered with slotted steel plates made by the Harrington & King Perforating Company. The slots are ⅜ x ¼ inch in some plates and ⅜ x ⅜ in others. The slotted plates are easily removed, and when the requirements are exacting as to phosphorus we substitute plates of ⅜ mesh on two of our five screens. We have demonstrated by exhaustive experiments that two sizes of screen plates, three sets coarse and two sets fine, will prepare the ore containing 0.426 in phosphorus (the greatest amount we have in the mine) for a separation having 0.036 with two passes on the magnetic separators. Ordinarily the phosphorus in the Croton ore runs from 0.1 to 0.3 per cent. When the phosphorus runs higher than six-tenths three sizes of screen plates should be used, delivering to three receiving bins, and each size should be treated separately on the magnetic separators; and

* Read at the Glen Summit meeting of the American Institute of Mining Engineers.

I am positive that this treatment will insure a Bessemer product running not over 0.05 in phosphorus, using nearly any of the New York State magnetites that are free from titanium.

In some experiments we have used 18-mesh screens, and with ore prepared for this grade we were enabled to produce continuously, with two passes, concentrates showing 70.60 metallic iron, 0.018 phosphorus and 0.220 sulphur. Of course the silica was extremely low. With the latest Hoffman separator, using 12 mesh screen, and making two passes, we have produced concentrates showing 70.93 metallic iron, 0.017 phosphorus and 0.231 sulphur; and by using 18-mesh screens we can depend

We always reply, as little as any other portion of the process. Seven cents per gross ton of concentrates is a liberal allowance, and this includes all repairs to separators. We shall reduce this to less than 6 cents soon. Repairs and supplies throughout our milling plant amount to 1 $\frac{5}{8}$ cents per ton of raw ore ground. Hence it will be readily seen that the feature of the problem of magnetic separation is the initial mill grinding or granulating. The very cheapest process is absolutely necessary, as most of the ores to be reclaimed will analyze less than 40 per cent. metallic iron, and that means from 2 to 3 tons of ore to produce 1 ton of concentrates. Using Sturtevant mills and 22 per cent. ore, we

ings run, in iron, from 7 to 8 per cent. About one-third of the ore is taken from the old dumps. On the basis given below 580 tons is crushed every 20 hours, with a production of about 265 tons of concentrates in the same time:

Statement of Cost.

Mining, crushing, and delivering to roasters 2 1-5 tons of raw ore, at $\frac{2}{3}$ gross tons per yard.....	\$1.13
Roasting, including top filling.....	0.23
Handling at roasters.....	.63
Preparation and screening.....	.22
Daily renewals, supplies and repairs of all machinery and roasters.....	.05 $\frac{1}{2}$
Separating, including labor and power.....	.07
Delivery to Harlem Railroad switch, including railroad repairs.....	.04
Office and laboratory expenses.....	.04 $\frac{1}{2}$
Insurance, interest and taxes on plant.....	.13
	\$1.95

During the last winter and spring a continuous run of five months was made of 20 hours each day, and the average cost of a gross ton of concentrates for the whole term was \$2.10. Improvements have reduced this amount to the figures of \$1.95, given above. Analyses are made at our laboratory daily of ore at mines, ore after leaving roasters, concentrates and tailings, by G. K. Volckening, Jr., our chemist. The following analyses cover an average two weeks' shipments in July, August and September of the present year. All concentrates were from screens with slots $\frac{1}{2}$ x $\frac{1}{2}$ inch, and all samples were from carloads:

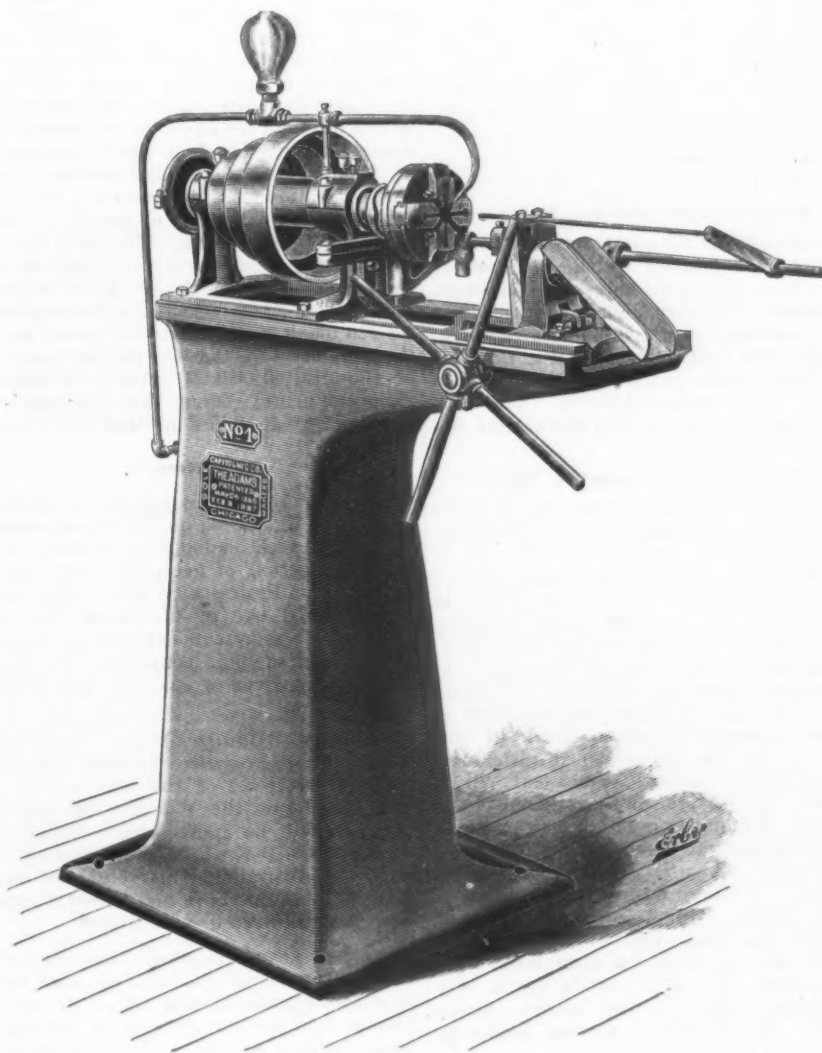
	July 7.	July 15.	Aug. 10.	Sept. 5.
Metallic iron, dried at 212° F.....	68.55	68.080	68.25°	70.090
Phosphorus, dried at 212° F.....	0.0365	0.0368	0.030	0.045
Sulphur, dried at 212° F.....	0.240	0.340	0.475	0.170
Silica, dried at 212° F.....	3.500	3.610	2.951	2.513

Machine for Threading Bicycle Spokes.

The Capitol Mfg. Company of Chicago, Ill., have designed a new machine especially intended for threading bicycle spokes. The threading head as used on this machine is similar to the Adame automatic, which we described in a previous issue, with the exception that the dies can be universally adjusted, and one movement of a spanner, which is applied to a ring on the back part of the head, moves all four dies simultaneously. The dies can be adjusted to the very smallest fraction of an inch. The carriage is provided with self-clamping and releasing vises, and all the operator has to do is to feed the machine. The thread is cut to its proper length, when the dies open and discharge the work automatically.

The adjustment to cut the proper length is very simple, and the force pump supplies a continuous flow of oil. These machines are also available for a number of other purposes, such as threading small rods, &c. The capacity of the machine is from the smallest to $\frac{1}{2}$ wire. Some of the principal manufacturers of bicycles are now using these machines.

Although only seven years in existence, the salmon canning industry of Alaska has become more important than that of any other region. The increase in growth during the past few years has been phenomenal, especially in 1889, when the pack of 675,000 cases represented an increase of 377,000 cases over the previous year. How long the supply of salmon can keep up under this enormous drain cannot be predicted, but it would seem that in any event Alaska is to be the great salmon region of the future.



MACHINE FOR THREADING BICYCLE SPOKES.

on 71 per cent. concentrates with one pass on this machine.

Examinations for the purpose of detecting screen, shute and bin leaks must be made at least twice a week. The screens deliver their finished product to two bins placed on the floor above the separating department, each having a capacity of 80 tons. Eight shutes deliver the ore to the separators, nine in number. The separators were designed and constructed by W. D. Hoffman and T. Blass, at our mines. On eight of the machines the ore is passed before the magnets twice to bring the loss in tailings to 8 per cent. Our superintendent, W. D. Hoffman, has lately designed two new separators, one of which is giving with one pass concentrates of 68 to 70 per cent., with a loss of only 6 $\frac{1}{2}$ per cent. of iron in the tailings. As patents are now pending, these machines cannot be described here.

People frequently ask how much it costs to separate the iron ore from the gangue.

can pay a small profit at our plant. Crushers and rolls require 28 per cent. ore to pay at the present price of concentrates. We contract our mining and initial crushing ready for and delivered to roasters to Charles Vivian of Brewster, N. Y., at an average price of \$1.38 per cubic yard. The ore weighs from 5500 to 6800 pounds per yard. We are selling concentrates at present to six furnaces, which use from 35 to 53 per cent. of them in their regular mixture. The furnacemen tell us that their flux and fuel are reduced, but most of them decline to give the exact amount. We have yet to receive a complaint from any of our customers as to quality or fineness.

An accurate, though condensed, statement of the cost of mining, crushing, roasting, preparing, and separating one gross ton of 68 per cent. concentrates, from 2 $\frac{1}{2}$ tons of 38 per cent. ore, according to the present daily practice at the Croton Mines, is given below. The tail-

WORLD'S FAIR NOTES.

Progress on the Buildings.

In every department of construction work at the grounds has been greatly advanced the past week. Upon each of the buildings a larger number of men are now employed than hitherto, and this is true of all branches, grading, foundation-making, substructure, superstructure, iron work, staff-making, modeling and decoration, and landscape development. Summarized, the present state of the work upon the building is as follows:

Manufactures and Liberal Arts.—Nearly one half of the foundation work is finished and one-quarter of the area is now ready for flooring, in which about 350,000 feet of lumber has already been put in. Two gangs of men have been employed in floor laying and have followed up the foundation work as soon as it has been completed section by section. The working force on the building has been doubled since last week.

Fisheries and Aquaria.—The foundations are all in, sawmills running full capacity cutting timber for superstructure. At present there is plenty of material to go on with. The construction track to the building has been increased and improved.

Woman's Building.—The roof structure is being commenced at the south end. Wood work of the entire edifice is well closed in, and the exterior covering of "staff" is placed for the two loggias, or inner courts, of the west side of the north end of the building.

Horticultural Building.—The foundation is completed, uprights are being placed for the superstructure, the piling for the dome is finished and the ironwork for the dome is arriving.

Fine Art Gallery.—At the site of this building in the improved portion of the park, engineers and their assistants have begun work. The construction track is to be built at once and ground to be broken this week.

Transportation Building.—The wood work the entire length of the building, approximately 1000 feet north and south, is nearly completed for the first story. Work on the second story is being advanced at the south end of the structure.

Mines and Mining Building.—Three of the great iron trusses at the south end are now completed and all the supporting iron columns are in. The carpentry work is well enough along to permit of exterior covering in some sections at an early date.

Electricity Building.—Nearly all the main flooring is now finished and superstructure work will be begun early next week.

Administration Building.—Foundation work is all in and iron work will be started as soon as the iron for building arrives. It is expected by the 15th.

Agricultural Building.—The foundations are practically completed and superstructure will be begun this week.

Pier and Casino.—On the great pier all the principal construction work is finished and work will be begun on the "mole" or semi-circular connection of the Manufactures Building at once.

Bids for Machinery Hall.

Bids for Machinery Hall were opened on the 7th inst. by Chief Burnham. Owing to the peculiar form of the bids for iron work, the construction department is unable to furnish the total of the lowest bids. The iron workers bid by the pound instead of by the job, and it will not be known until the building is finished how much that part of it is to cost. The lowest figures on the iron work were those of Binder & Seifert, 3.698 cents per pound. Exclusive of the iron work, the building

will cost \$645,910, the lowest bids being as follows: Carpentry work, Probst Construction Company, \$358,217; painting and glazing, Reilly & Barker, \$10,693; exterior covering, Staff Decorating Company, \$159,000; roofing, \$118,000. J. A. McGonigle of Leavenworth, Kan., bid \$318,800 for the carpentry work, painting and glazing, which is \$50,110 below the sum of the next lowest bids for that work. The contracts will be let soon by the Grounds and Buildings Committee.

Government Building Contracts.

The Secretary of the Treasury awarded contracts for the Government building, at Chicago, to four different contractors, as follows: To James F. Reese, Chicago, wood work, painting and glazing; to Haugh, Ketcham & Co., Indianapolis, the entire iron work; to the Northwestern Construction Company of Chicago, galvanized iron and metal work; to George S. Lyon & Sons, Chicago, the plumbing. The aggregate cost of the contracts will be \$316,757. By dividing up the contracts Architect Edbrooke makes a saving of \$22,000.

Contracts for the Art Palace.

Contracts for the construction of the Art Palace were awarded on the 5th inst. by the Committee on Grounds and Buildings, as follows: Masonry, John Griffiths, \$149,700; carpentry work, Steinmetz & Eilenberger, \$68,793; galvanized iron work, J. C. McFarland, \$42,855; structural iron work, A. Gottlieb, \$51,400. Contracts for other portions of the work were not awarded.

Lake Front Assembly Hall.

Closely associated with the World's Fair, but not forming a part of the group of buildings on the grounds, will be an important structure to be erected on the Lake front near the heart of the city. It will be known as the Lake Front Assembly Hall, and will be used during the Exposition for national and international assemblies. After the exposition it will be used by the Chicago Art Institute as their permanent quarters. Part of the cost of erection is to be furnished by the exposition authorities and part will be raised by private subscription by the citizens of Chicago. The construction of the building was definitely decided upon last week. It will stand about where the old Interstate Exposition building is now located, which is to be removed within the next two or three months. Plans for the new building have been completed, and they provide for a very elaborate edifice, in the classic renaissance. The building is to cost \$600,000. Contracts will shortly be let.

The Engineers' Congress.

E. L. Corthell, chairman of the General Committee of the World's Congress Auxiliary on Engineering Congresses, and chairman of the Executive Committee of General Committee of the Engineering Societies of the United States, has recently arrived home after an extended tour through European countries, in which he had occasion to come into personal communication with distinguished representatives of nearly all of the important engineering interests of the Continent. In the countries he visited he says nearly all the engineers he met signified their intention of coming to the congresses and the exposition. He attended the annual convention of the Mechanical Engineering Society of Germany, held at Dusseldorf. This society numbers about 6000 members, and the council decided to accept the invitation to take part in the congresses. Mr. Corthell was informed by the president of the Society of Civil Engineers and Architects of Germany, which also numbers about 6000, that they had acted on the invitation and had gladly accepted it.

Letters have been received also from engineering societies in countries which he was not able to visit, expressing a great interest in the proposed congress, and giving assurance that their councils would act upon the matter immediately after their vacation. There has been also received a communication from the president of the Mexican Association of Engineers and Architects, with the information that the association is glad to accept the invitation, and that it will send delegates to the congress.

Planning Their Exhibits.

Two American industries of national importance are preparing to do something unusual at the Exposition. One is the National Association of Woolen Manufacturers and the other is the American Pottery Association. Chief Allison has received from the secretary of the former association a resolution passed by its Executive Committee at a recent meeting, which provides for a special committee to confer with the Chief of the Department of Manufactures, and also resolves that the association shall make such a display of manufactured woolen goods as has never before been seen. The idea is to outrank the European representatives of the same industry. B. W. Blair, secretary of the Pottery Association, has applied for 225 blank applications for space, and the secretary adds that the pottery makers of the United States intend to show European manufacturers that this country has made great strides in that particular branch.

Brevities.

Professor Ward, mineralogist, of Rochester, N. Y., called on Director-General Davis last week and offered to bring his entire collection of geological specimens to the fair. Professor Ward's collection is considered one of the finest in the country. It represents the work of years. At the Philadelphia centennial the collection was given a space of 120 x 130 feet.

Frederick Bathurst of the Australian *Mining Standard*, writes to chief Handy that the last issue of the *Standard* contains a leader on the World's Fair which he is sure will be appreciated. He adds: "I may state that we have determined to make the Australian mineral exhibit one of the finest in the show, and I trust, therefore, you will keep us well posted."

Director George Schneider has received advices from Berlin to the effect that the associated chemical works of the German Empire had agreed to make a full and comprehensive exhibit at the Exposition in 1893. As is well known, the German Empire leads all the world in the matter of the chemical manufactures, and the exhibit thus determined upon cannot fail to be one of the most attractive and instructive at the exposition.

October 30 will be the World's Fair day at the Texas State Fair at Dallas. That day every one who owns stock in the Texas World's Fair Association will be admitted free to the fair, and the association will try to have every visitor buy some of the stock. Texas is trying to raise a World's Fair fund of \$300,000, and has already made most encouraging progress.

There will be not less than 25 restaurants, as well as numerous cafés in the exposition buildings. It is the intention of the exposition authorities to protect visitors from exorbitant charges.

A verdict of \$7000 was obtained by the New York State authorities against the New York, New Haven and Hartford Railroad Company, as penalties under the act forbidding the use of stoves in passenger coaches.

THE NEW MORTARS.

Their Design and Manufacture.

BY A. A. FULLER AND F. N. CONNET.

Through the courtesy of the *Stevens Indicator* of the Stevens Institute of Technology of Hoboken, N. J., we are enabled to present the following very complete

Builders' Iron Foundry of Providence, R. I., calls for 30 cast-iron mortar bodies, which are already completed; the second, with the Midvale Steel Company of Nicetown, Pa., calls for 30 sets of steel hoops and mortar forgings, which are partially completed; the third, with the Builders' Iron Foundry, calls for the finishing and assembling of 30 12-inch breech-loading mortars, which are now building. This paper will treat only of the first and third contracts.

by the circulation of water through the core, according to the Rodman process, so that no excessive strains shall remain; radial, tangential and longitudinal test specimens from disks B and D, Fig. 1, cut from both muzzle and breech ends of the mortar, to have an elastic limit of about 11,000 pounds and a tensile strength between 30,000 and 37,000 pounds per square inch, or nearly double the strength of ordinary cast iron; one-fifth of the entire casting to be cut off for a shrink or



Fig. 1.—Outline of Cast-Iron Body.

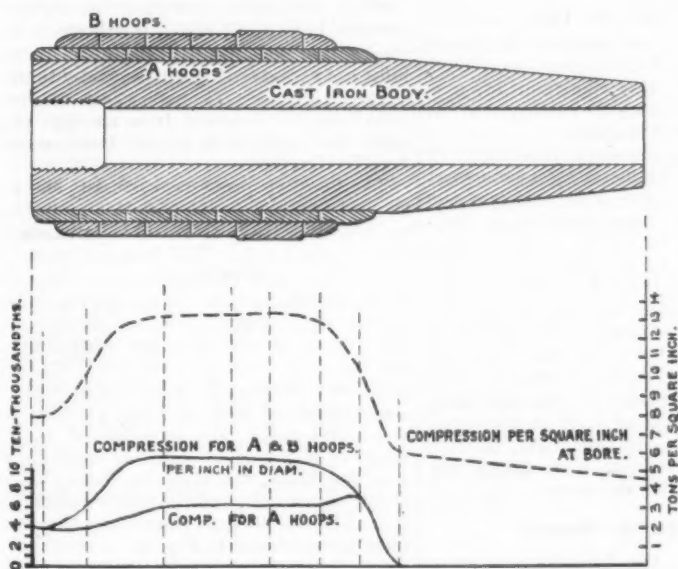


Fig. 2.—Arrangement of Hoops and Compression Diagrams.

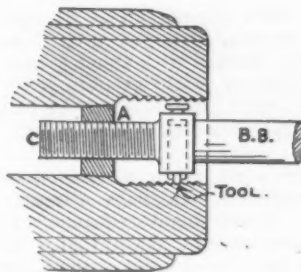


Fig. 5.—Arrangement for Threading.

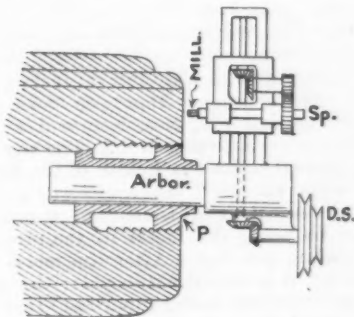


Fig. 6.—Special Milling Machine.

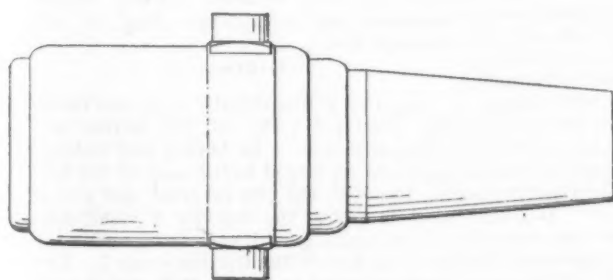


Fig. 3.—Outline of Finished Mortar.

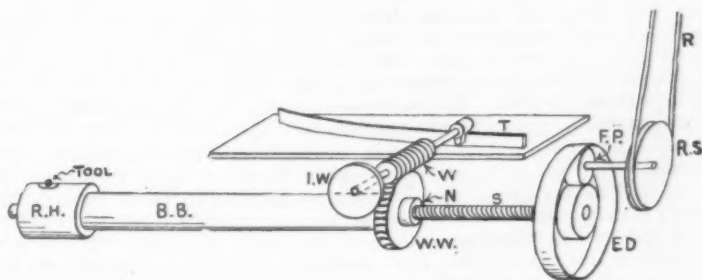


Fig. 4.—Diagram of Boring and Rifling Machine.

FABRICATION OF 12-INCH MORTARS.

description of the construction of the 12-inch rifled mortars now building for the Government. This subject is viewed with unusual interest, owing to the fact that guns of this kind are now at Sandy Hook and will be tested during the next few months:

General Description.

The official designation of this type of gun is "12-inch breech-loading rifled mortar, cast-iron body, steel hooped, 14½ tons," and the first lot of the same for our own Government includes the fulfillment of three contracts. The first, with the

These mortars are of the French type, with breech-loading mechanism similar to that introduced by De Bange, and, as their name implies, have cast-iron bodies with two rows of steel hoops shrunk thereon. These bodies have a 12-inch bore, are 129 inches long and 31½ inches diameter, while the diameter over hoops is 41½ inches. The "chase," or forward conical part, tapers down to 23½ inches, as shown in Fig. 1.

The Specifications

in the first contract call for the casting to be made from charcoal pig and to be cast vertically, breech downward; to be cooled

sinking head, E, Fig. 1. From the disks are also to be cut two "initial stress" rings, one near the bore and the other near the exterior. The diameter of each is observed previous to its being parted off, and if initial compression be present this diameter will increase after separation and a corresponding decrease will result from initial tension. The former is, of course, desired near the bore and the latter near the exterior.

The metal is also tested for specific gravity and hardness; the latter is a comparative test, and is made by forcing a

standard steel pyramid into the metal and noting the depth to which it sinks under constant pressure. Most of the above tests are made on the Emery testing machine, at the Watertown Arsenal.

Method of Casting.

The body is cast vertically in a pit. The flask consists of six flanged cylinders, 57 inches inside diameter, clamped together. Each of the five upper sections of the mold is 3 feet high, and is formed by ramming "dry sand" about a cylindrical pattern 33 inches diameter; the lower section, however, is but 1 foot high, and contains a cast-iron pot placed in the center, around which the sand is rammed solid to a depth of 12 inches, thus forming a bottom for the mold; the rim of this pot protruding into the cavity of the mold fuses with the molten metal, seals the end of the hole made by the core and prevents the water from penetrating the sand when turned directly into the bore after the removal of the core. This core consists of a hollow fluted column about 8½ inches outside diameter, wrapped with ¾-inch manila rope, covered with about ¼ inch of loam and faced with graphite. It is placed vertically in the center of the mold, and through its interior cold water is made to circulate.

The metal is melted in what is known as an air furnace, which is a structure resembling the reverberatory furnace in its general characteristics, except that it has a tap hole at the lowest point of the hearth. The combustion takes place over grate bars, the hot gases passing over a bridge wall are reflected downward upon the metal, and are thence drawn up a tall chimney. The iron being thus separated from the fuel is more uniform and homogeneous, giving more reliable results than could be obtained with the ordinary cupola. The charge is about 20 tons of mixed charcoal pig, Nos. 2, 3 and 4, of Lanesboro or Muirkirk iron. The metal being placed upon the hearth of the furnace, about six hours are required to completely fuse it, and from 2 to 6 hours longer to bring the metal to the proper state before pouring. After the metal is "down" it is stirred with a pole; the sap and water therein, being vaporized beneath the surface of the metal, aid in a thorough mixing. Small samples of the heat are taken from the furnace at short intervals and cast into square test specimens about 1 foot long and tapering from 2½ to ½ inch; these specimens are broken under the hammer, and the time for pouring is judged entirely by the nature of the fractures thus obtained. The amount of coal consumed is about 14,000 pounds, or 37 per cent. of the weight of metal, which is nearly four times the amount required by an ordinary cupola. In the case of the air furnace, however, a portion of the fuel is required to refine the metal, oxidizing a portion of the carbon and inducing a chemical union between that remaining and the iron, so that the fracture is whiter and shows less graphite than common cast iron. The metal being tapped off, flows through a long trough of fire clay into the mold; midway in this trough is placed a large circular swirl basin, where a portion of the metal is first allowed to accumulate. The velocity is also here reduced, and the skimming is easily accomplished. The runners of the mold have a tangential component in reference to the axis of the casting, which produces a rotation of the whole mass of metal around the core. Water is kept constantly circulating through the core, and the cooling at once commences. When the mold is full the runners are stopped up and the surplus metal switched off by a branch trough into a ladle. A portion of this metal is afterward poured directly into the top of the mold, to sup-

ply a reduction in length due to shrinkage. The top of the casting is covered with charcoal, and a charcoal fire is built in the pit around the outside of the iron flask to keep the exterior from cooling too rapidly. In about 24 hours the core is removed and the water turned directly into the bore of the casting for a day or two longer. Fig. 1 shows the complete casting.

Boring and Turning.

The casting is next placed in a gun lathe, which is of heavy build, with a long boring bar attachment instead of a tail stock. The gun is held and driven by a large chuck on the face plate; the other end of the casting runs in a semicircular bearing or steady rest. The boring bar has no rotary movement, but is fed toward the face plate and carries a reamer-like cutter head which enlarges the hole by several cuts to 11.8 inches. Meanwhile ordinary turning tools are reducing the outside diameter, turning down the chase or forward taper and parting off the test disks and shrink head. The parting tools are run in nearly to the bore, the gun body is removed from the lathe, and the disks broken from the casting by wedge and sledge. The body is now completed in the rough, the test specimens are machined and the work on the casting is completed for the first contract.

The hole is next enlarged to within 0.1 inch of the final diameter by a somewhat novel tool, the idea being to overcome the difficulty always encountered with cast-iron chips, and also to bore straight and not be affected in the least by the existing hole. The head carries but one tool, and the chips are caught and retained by a sort of tray. The course of the hole is governed by a long accurately made follower or collar, revolving with the gun. Preparatory to the shrinking on of the first row of steel hoops, they are faced at the ends and bored to 31.5 inches diameter, 0.003 inch being the allowed variation for the latter.

Shrinking the Hoops.

The outside of the body is now accurately turned to a varying diameter slightly larger than the inside of the hoops shrunk thereon. This difference is called the "shrinkage," and its exact amount has been determined mathematically by Captain Birnie. It varies along the entire length to be hooped, the purpose being to place each hoop in both rows under nearly equal tension. The average amount for the A hoops, however, is about 0.45 inch, and for the B hoops it is about 0.040 inch. The total compression produced at the surface of the bore due both to the hooping and to the Rodman system of casting is shown graphically by the upper curve in Fig. 2, where each ¼ inch vertically represents 1 ton per square inch. As might be supposed, the diameter of the bore is slightly decreased by this treatment, the amount per inch being shown by the lower curve in same figure. It will be seen that the curves are very similar.

The mortar body is now placed on a special car, which holds it by the chase in a horizontal position, and is taken to the hooping department, wherein are the heating furnace, system of hoists and trolleys, sprinkling apparatus and sewer connections.

The heating is done by city gas in a furnace sunk beneath the level of the floor. Air and gas are mixed in about the proportions of three to one by an injector and forced into the furnace and pass into 36 vertical pipes, each containing four horizontal nozzles of a peculiar form arrived at by experiment. The liability of explosion has been done away with by an arrangement of sieves. The hoops to be heated are of various thicknesses, diameters and lengths,

and one carries the trunnions, hence the burners have to admit of various easy and quick adjustments. The flames play directly against the hoop, both inside and out, and heat it to about 500° F., or to a point where a certain minimum gauge will enter, but not far enough beyond to admit another 0.015 inch larger, the total expansion being about 0.09 inch. This type of furnace has proved capable of very close regulation and leaves little to be desired. During the heating the plane of the hoop is horizontal, but it is changed to the vertical as it is hoisted out of the furnace. The hoop is now shoved along by means of the trolley track till it slips over the gun and up to its proper place, when, by means of the hooping press a force of 100 tons is exerted to make a tight joint between it and the one immediately in front. A plane of water from the spinkling ring is then allowed to play on the forward portion, which soon contracts enough to grip the body; the plane of water is then moved slowly backward till the entire hoop is cold. The reader can see the necessity of cooling, and hence clamping, the forward portion before the rest, for otherwise the contraction ensuing would open up the joint notwithstanding all the pressure that could be applied. The closeness of these joints may be inferred from the fact that after the exterior is turned they can seldom be detected.

The hooping press used consists essentially of two screws, each of 50 tons capacity, pulling on a heavy cast-iron collar directly behind the hoop. The forward ends of these screws pass through nuts on the ends of an equalizing beam whose fulcrum bears against the stopper that closes the muzzle. This beam necessitates the operating of one nut only, and as they are furnished with ball bearings the required pressure is easily obtained with two men pressing on a 6-foot lever. The exterior of the A hoops is now turned down as carefully as was the body, the B hoops shrunk on in a similar manner, and the entire exterior is turned to the finished diameters, the final form being shown in Fig. 3.

The next step in construction is the fine boring, which is accomplished by a succession of reamers used with a special lubricant, which insures the hole to be the exact size of the reamer. The final bore must be between 12.000 inches and 12.003 inches diameter, and straight enough to allow a test cylinder 11.997 inches diameter and 42 inches long to slip through easily.

Rifling.

Figure 4 is diagrammatic only, and shows the principal parts of the boring and rifling machine. In boring and reaming the tools are keyed to the end of the boring bar B B, the gun revolves, and a slow feed is given the bar by a small spur pinion meshing with spur teeth cut on the external face of the friction drum F. This drum is keyed to the screw S, which runs in a circular nut inserted into the worm wheel W W, and attached to the boring bar.

Next comes the rifling. Few operations in machine-shop practice require as much care as the rifling of a cannon, since so much is at stake. There is no part of the most expensive steam engine but can be replaced in case of an accident during the manufacture, but here the result of months of labor may be entirely spoiled by a false cut. The body would be ruined and the steel hoops encircling it would be worthless. The necessity for extra care both in the design and operation of the rifling machine is apparent. Among the mechanical safeguards is an electrical contrivance for stopping the machine instantly. A lever with an armature attached holds the mechanism in running order as long as the closed circuit is on

the electro-magnet coils attracting this armature. It is then a comparatively simple matter to provide a number of contrivances to short circuit the current at the operator's will, or automatically, the moment any detail gets out of alignment.

the end of this screw, and between the two parts of this gear the friction pinion P, driven by a rope belt R, revolves constantly in the same direction. When this pinion is brought into mesh with the large internal gear a comparatively slow motion

on a planer. On the end of the boring bar is keyed a worm wheel W W, and the worm W engaging therein is long, allowing it to be used both as a worm and as a rack. It is used in the former capacity when indexing the bar and tool from groove to groove, and in the latter capacity when giving the rotary movement to the bar, which combines with the longitudinal movement to form the helical grooves. The frame holding the worm has an arm, at the end of which are two small rollers, one running on each side of a flat track, bent in a horizontal plane to a curve, which is the development of the helical grooves in the gun. When the boring bar moves longitudinally the rollers running upon the track give a transverse movement to the worm, thus rotating the bar the proper amount for every foot of advance. The track is a flat piece of planed steel and can be bent by screws and clamps to the required curve. In these mortars an increase pitch is used, varying from one turn in 25 calibers to one in 40, the curve being a semi-cubic parabola; 68 grooves are cut 0.379 inch wide and 0.07 inch deep. The object of the increase pitch is to avoid a too sudden initial rotation of the shot when fired. On smaller and less expensive ordnance the uniform pitch is still retained,

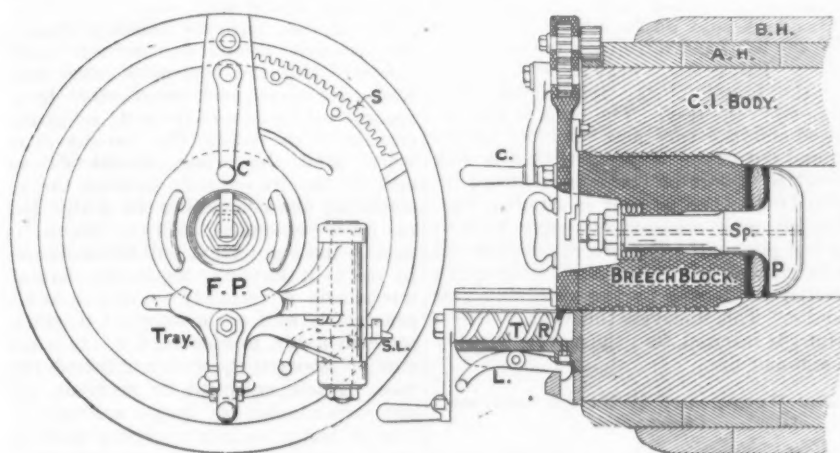


Fig. 7.—Rear Elevation and Central Longitudinal Section of Breech Loading Mechanism.

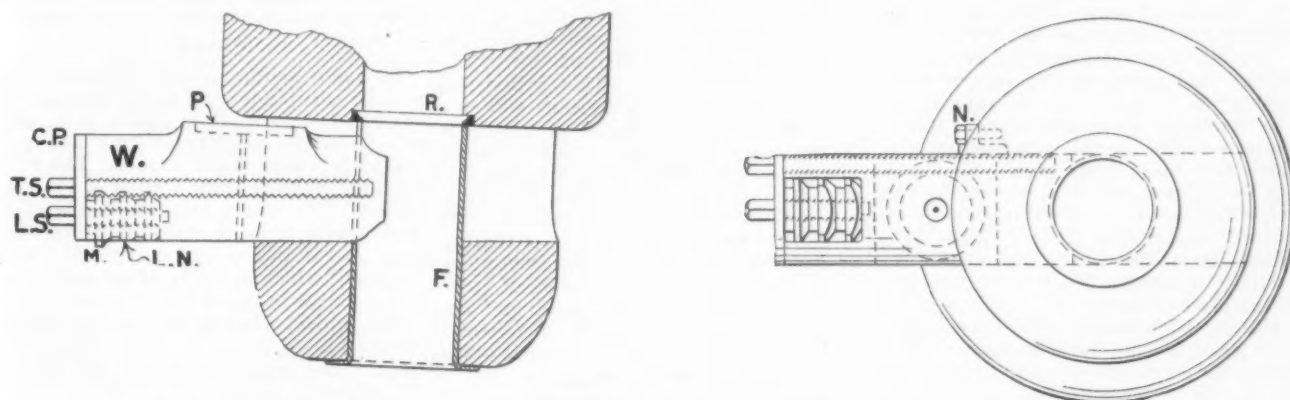


Fig. 8.—The Krupp Breech Block.—Horizontal Section and Rear View.

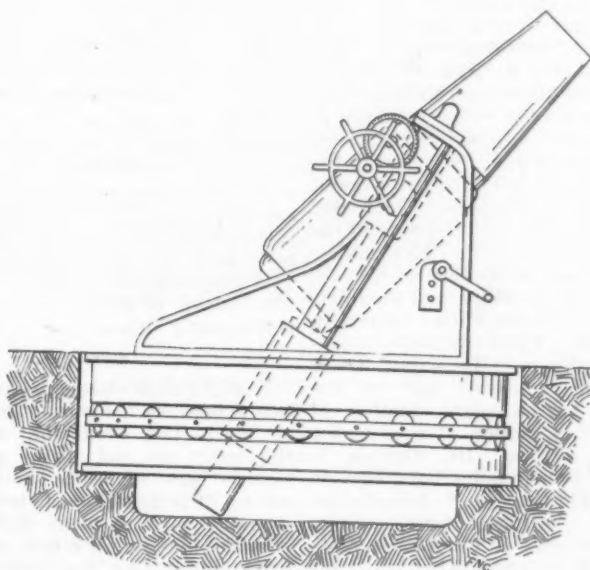


Fig. 9.—Mortar Mounted on its Carriage.

FABRICATION OF 12-INCH MORTARS.

In rifling, the tool is held in the rifling head R H attached to the boring bar B B, and a backward and forward motion is given it by the rapid revolution of the regular feed screw. A combined internal and external friction gear F is placed on

is given the boring bar in the cutting direction. When brought into mesh with the small external gear a quick return is obtained. The work is quite noiseless, and the reversal takes place within more narrow limits than is usually accomplished

and its manufacture is easier, since the rotation of the rifling bar can be effected by gearing instead of some form of cam. The rifling head R H, or arrangement for carrying the tool, is keyed on the end of the boring bar, and contains a wedge to which motion is imparted by a buffer at each end of the stroke. The movement of this wedge sets the tool out at the beginning of the cutting stroke, and withdraws it at the end. This head, being furnished with slightly compressible wooden lags, entirely fills the bore, and at the same time does not mar its surface. The depth of cut is adjusted by a nut that governs the amount of movement of the sliding wedge, and as the movement of the wedge is much greater than that of the tool, it is possible to obtain a very fine adjustment of the tool. The limit allowed on the depth of each groove is 0.0015 inch. The removal of the chips is accomplished by a series of steel scrapers, which push the chips out at each end of the bore.

Threading.

The next operation is the threading, which is done with an attachment on this same machine. To insure a thread of exactly the same pitch as that on the breech block the lead screw C, Fig. 5, is cut on the same lathe as the breech block itself. The nut A is made to take up wear, and is fastened in the tapering part of the bore directly in front of the threaded recess. This lead screw has a head or enlargement at the back end with a device for holding and feeding the cutting tool T radially.

This head is also keyed into the boring bar. The nut N, Fig. 4, is detached from the bar, which does not revolve while the tool is cutting. The nut A, Fig. 5, revolves with the gun, pulling the feed screw tool and boring bar along at the proper speed to give the correct pitch to the threading. To run the tool back the gun is stopped, and the bar is rapidly revolved by means of a rope belt driving the worm W.

In slotting out the interruptions in this threading the nut N, Fig. 4, is replaced in position, and the boring bar is given its planer-like motion the same as in rifling, but with short stroke. A small shaper head with apron is keyed into the bar for this process, and the whole machine becomes a large shaper. A toothed wheel, with pawl and lever, are placed on the worm shaft and give a circular feed to the bar and shaping head.

The longitudinal reciprocating motion of the bar is also employed in lapping or smoothing the bore with emery imbedded in a cylinder of soft metal.

The hinge block H B, Fig. 7, and segment S are mortised into the breech end of the mortar. These mortises being quite irregular in form, their manufacture is often conducted by drilling, chipping and filing, a difficult and unsatisfactory method when interchangeability is desired. A special milling machine, Fig. 6, was therefore constructed, resembling somewhat a horizontal radial drill.

The machine is centered and held in the bore of the mortar by the plug P. The spindle Sp is capable of two movements, one of rotation about, the other radial to, the axis of the mortar, a combination of these two movements giving, of course, any desired movement to the milling cutter. The spindle and milling cutter are guided along their proper path by a templet or profile plate bolted against the mortar. Drills are afterward substituted in the place of the milling cutter, and the necessary bolt holes are drilled and tapped. The whole apparatus is portable, and is driven by a rope belt after the manner of the various small drilling machines now on the market.

Fig. 7 shows a rear elevation and a central longitudinal section of the breech-loading mechanism for these mortars. The breech block and the recess into which it locks are cut with a thread of 0.9 inch pitch; these threads are then interrupted or planed off longitudinally in three places, each 60° wide. This allows the block to be shoved into the recess the whole length, then, when turned 60°, the remaining thread on the block and in the recess mesh with each other, locking the block in position.

The face plate F P is a banjo-shaped piece, dovetailed to the breech block, and turns it in and out of mesh with the interrupted thread by means of the crank C and the gear running in the circular rack or segment S. The tray, of composition metal, is swung to the breech face of the mortar by means of a vertical pin passing through two lugs or projections on the hinge block H B. The latch L holds the tray against the breech face of the mortar and the securing latch S L holds it when swung back out of the way for loading. T R is the translating roller which moves the breech block in and out of the breech recess by means of a stud attached to the face plate and running in the left-hand groove cut in the roller. The roller has also a right-hand thread and travels in the tray as a nut. The spindle Sp is fitted loosely in the center of the breech block, and has a 0.2-inch hole drilled through its entire length. The primers are inserted in this hole and the charge exploded thereby. Behind the mushroom shaped head of the spindle are two steel gas-check cups which enclose the gas-check packing P. When the mortar is fired this packing is squeezed

out against the sides of the bore between these cups, preventing the escape of the gases in a backward direction. The face plate is inclined toward the right when the breech is locked.

Loading.

To load, unlock by turning the crank C to the right, bringing the face plate as shown. A stud on its lower face comes into the left-hand thread of the translating roller. This roller is next rotated, pulling out the breech block, spindle and face plate on to the tray. The latch is now released and the tray and contents swung around out of the way. The shot is now raised by a sort of crane and shoved in. Next follows the powder in a canvas bag. The tray with contents is swung back to its first position. The breech block is run in by turning the translating roller crank handle, and locked by the revolving gear handle. This uncovers the vent, where a primer is inserted, and the mortar is ready to aim and fire.

The Krupp and DeBange Systems Compared.

At this point it may be of interest to make a comparison between the Krupp system of breech loading for heavy ordnance and that of DeBange. In the Krupp system the breech is closed by a cylindrical block or wedge W, Fig. 8, sliding in a cylindrical opening of the same shape, whose axis makes an angle slightly less than 90° with the longitudinal axis of the gun. This cylindrical block is flattened on its forward side to a plane making a slight angle with the axis of the block and a right angle with the axis of the gun, thus forming a wedge, one side of which is cylindrical. When the wedge slides in and out it is guided by its cylindrical surface, and held from turning by a spline way and key; the front plane surface, therefore, takes a series of positions all parallel to each other, and approaches and recedes from the corresponding plane surface of the cylindrical opening in which the wedge slides.

Near the center of the plane surface of the wedge is inserted a disk, forming the gas check plate P, and in the plane surface of the opening and concentric with the bore, is a gas check ring, R; these two come in contact when the block is screwed "home" into firing position, and are supposed to stop the entrance of gases to any other part of the breech mechanism. In heavy ordnance the wedge is moved in and out by means of a traversing screw, T S, running in a nut, N, attached to the body of the gun; O, is a cap plate screwed to the back end of the wedge. The wedge is locked into position by means of the screw L S and its nut L N. The locking screw bears at one end in the cap plate in which it is held by collar and shoulder, the other end of the screw has a bearing in the wedge itself. The screw has no movement of translation. The nut L N is situated in a recess cut in the wedge, and has a slight motion of translation and a motion of rotation for one-third of a turn. Its rotation is stopped at the proper point by a stud on its exterior. The nut L N has circular grooves cut on its exterior, forming circular teeth and spaces. With the exception of one tooth, M, nearest the cap plate, the portions of these teeth which protrude above the surface of the wedge, when the nut is in its unlocked position, are planed off flush with the exterior of the wedge, allowing it unimpeded entrance into the opening. When the nut is turned the portions of the teeth before in the recess of the wedge engage in notches cut in the side of the opening to receive these teeth, and lock the wedge and gas check to correct position before firing.

To lock, slide the wedge into the opening by means of the traversing screw.

Next turn the locking screw; the nut first moves along the screw until its teeth come opposite to the spaces in the sides of the opening; the nut then turns with the screw, its teeth meshing with the spaces. The word "Locked" then shows cut in the face of the nut; the screw is further turned until the cap plate of the wedge bears against the nut.

To unlock, turn the locking screw in the opposite direction; the nut ceases contact with the cap plate, then turns with the screw, and the word "Open" appears on the face of the nut; by further turning of the screw the nut moves inward until the whole thread M bears against the gun itself, holding the nut stationary and compelling the wedge itself to move outward until it brings up against the nut. Next pull the wedge out by means of the traversing screw. Krupp's mechanism is certainly ingenious, and in practice is said to work well; it may be somewhat slow to operate, but it is impossible to blow out the wedge or breech plug even if left unlocked by accident, and safeguards in time of battle are valuable. The DeBange system is being tried by many countries, while Germany and Russia use the Krupp mechanism. The United States are making all large ordnance with slight modification of the DeBange mechanism. The gas-checking device seems to be successful, and fully protects the rest of the breech mechanism from corrosion.

Firing.

In these mortars about 70 pounds of powder will produce an initial pressure of some 28,000 pounds per square inch, and give a muzzle velocity of 1200 feet per second to a shell of 650 pounds. This will insure a range of about 6 miles at 45° elevation. The hollow cast-iron shot is filled with a mild form of nitro-glycerine. Its front end is turned to a curve called the "ogival," which form offers least resistance to the air; its back end contains a soft metal collar, which, when forced into the rifling grooves, gives it the required rotary motion. The ingenious primer which fires the explosive is also placed at the back end of the shell. Its action depends upon the inertia of a little mass that does not move from its place when the shot is fired, but is projected forward against a fulminating cap when an object is struck. In other words, it is active during a minus and not a plus acceleration of the shot.

The Carriage.

These mortars are to be mounted on carriages, Fig. 9, very similar to cannon carriages, except that the recoil takes place 60° from, instead of in, the horizontal plane. This allows of a reduction in length of the carriage, and the set of rolls used for revolving about a vertical axis is continued around a complete circle, instead of relying on a small arc, as is frequently done.

General.

It might seem strange to some that cast iron is used for the mortar bodies instead of steel, but even the advocates of the latter do not claim great advantage in guns of such short bore. The casting of large masses of steel seems to be attended with so many difficulties, and what is of more importance, with so many uncertainties, that the Ordnance Department prefers good iron to doubtful steel. These mortars very closely resemble the steel breech-loading rifles made by the United States Navy Department, with the exception of their length, which in rifles is about 30 times the diameter of the bore, and in the mortars only about ten.

It is proposed to distribute over 1000 of these mortars along our seaboard, in groups of 16, to have them below the surface of the ground, and to fire them simultaneously by means of electricity, and it is not improbable that the latter agent will

also be used for aiming purposes, after the manner recommended by Lieut. Bradley Fisk. When one considers the number, the reliability, the range, the capacity and the great accuracy of aim obtainable in these mortars, some of the fears he may have entertained about the safety of our country from external foes should be dispelled. An opinion expressed by Lieut. William R. Hamilton, in the *Century Magazine* for October, 1888, is shared by many ordnance experts. It is, that this design of mortar has no superior the world over.

Combination Lathe Chuck.

The accompanying engravings show one of the latest styles of chucks made by the Skinner Chuck Company of New Britain,

slot from which it is shown in Fig. 2, thereby moving the cam ring (which held the annular gear in mesh) so as to allow the small cams on the back of the ring to drop into corresponding recesses provided in the back of chuck. The jaws of all the chucks made by this company are of steel, case hardened and then ground perfectly true.

The Use of Magnetic Concentrates in the Port Henry Blast Furnaces.*

BY N. M. LANGDON, PORT HENRY, N. Y.

It is now about two years since we began using concentrates from Port Henry magnetic ores in the blast furnaces of Witherbee, Sherman & Co. During this

the proportions and kinds of concentrated and other ores used, &c. It may be as well to say that all our ores are magnetic. The New Bed pure is mostly granular or shotty; the run of mine is usually a lump ore containing more or less of fine. Old Bed is about half lump and half fine, and of the mill ore three-quarters or seven-eighths is as fine as buckshot, the rest being lump. All lumps are hand broken to about 3 inches.

We began using New Bed concentrate in our No. 2 furnace, running on mill iron, commencing with one-fourteenth, which was continued for nine days without showing any bad effects, when it was increased to two-fourteenths, and this proportion was continued with two short intermissions for 56 days. The mixture was then changed to Bessemer, and the proportion of concentrate was two-tenths for 29 days, when it was increased to three-tenths for 15 days, then reduced to two-tenths for 80 days. During this time we had also used three-tenths concentrate in our Cedar Point furnace, running on Bessemer iron, for 56 days. Up to this time we had not used a larger proportion of the concentrate than three-tenths, but had used it with various proportions of our other ores in making both Bessemer and mill iron without any more troublesome experience than usual in the working of the furnaces, and also without any advantage, so far as could be observed, except that due to increased yield from the richer concentrate replacing "run of mine" and mill ores. There was no decrease in fuel consumption that could be attributed to the use of concentrate except what was due to the increased yield of the mixture. Pressure and general working of the furnaces were about as usual. Our fuel is three-fourths Delaware and Hudson lump coal and one-fourth Reynoldsville or similar coke.

In March last, the new concentrating plant at the mines having been completed, it was decided to concentrate Old Bed ore, running about 63 per cent. iron and 1.25 per cent. phosphorus, and at the same time to try the experiment of increasing the proportion of concentrate in No. 2

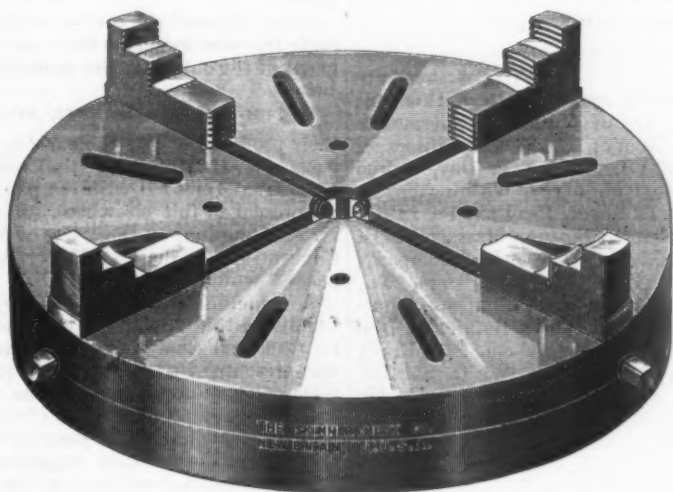


Fig. 1.—Front View.

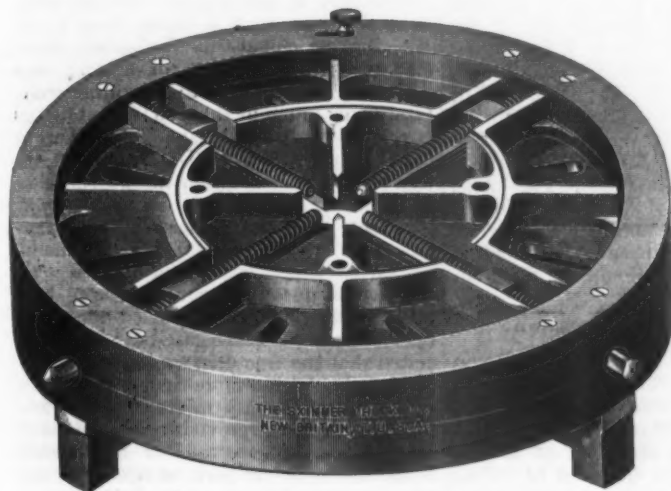


Fig. 2.—Back View.

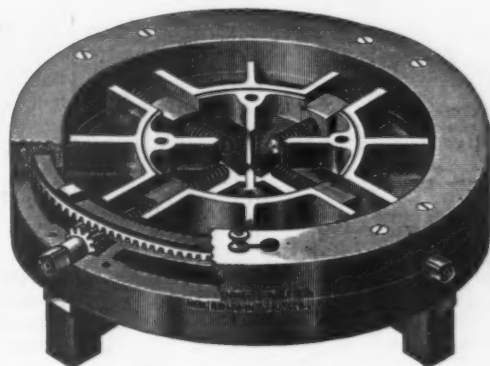


Fig. 3.—View Showing Annular Gear Thrown Out of Mesh with Pinion.

THE SKINNER COMBINATION LATHE CHUCK.

Conn. Fig. 1 is a front view of a 36-inch patent combination four-jaw lathe chuck with common style jaws. Fig. 2 is a back view of the chuck, showing the stud nut, by the movement of which, from one end of the slot to the other, the chuck may be used independently or universally (concentrically or eccentrically). The end of the slot is countersunk so that the stud nut may be screwed down and thus positively lock the gearing from being thrown out of mesh while the chuck is revolving. Fig. 3 shows the annular gear thrown out of mesh with the pinions, the stud nut having been moved to the opposite end of the

time we have had the usual ups and downs incident to blast-furnace practice, and have used the concentrates in various proportions with our New Bed (Bessemer), Old Bed (high phosphorus), and Mill ores, making both Bessemer and mill iron. In the early part of 1889, owing to frequent changes in the experimental concentrating plant, the supply was not regular, causing intermissions in which no concentrates were charged. The tabular statement given below shows the days run,

* Read at the Glen Summit meeting of the American Institute of Mining Engineers.

furnace, then running on mill iron, with the view of determining the maximum amount that could be used, and to note the effect of its substitution for other ores. We commenced with two-tenths concentrate and ran for nine days without noticing any effect either way, then increased to four-tenths for 12 days. During the 12 days' run the concentrate was of 16-mesh size and carried 67 per cent. of iron. All the previous concentrate has been of 10-mesh and 60 per cent. to 63 per cent. iron. When the four tenths came through a change was noticed at once, the furnace began to get hotter and the

burden was increased. After the 12 days' run the concentrate was made 10-mesh in size, and increased to five-tenths for eight days and then six-tenths for 14 days, when all concentrate was taken off. With each increase of concentrate the furnace got hotter, necessitating increase of burden. It worked very smoothly and regularly, but with 1 to 1½ pounds higher pressure with the larger amount of concentrate. During the latter part of the run, and from the time the charge of four-tenths concentrate began to work, the average fuel per ton of iron was 18 per cent. lower than it had been for several weeks preceding or was immediately after. Of this reduction in fuel, about 5½ per cent. was due to the increased yield of iron in the mixture.

It is but fair to say, however, that the iron made was less open (about one grade lower) than before the experiment. Just at this time we received an order for a low-silicon iron for immediate shipment, and as the tendency of this mixture, when making an open iron, was toward high silicon, the burden was kept rather heavier than it otherwise would have been, which, of course, made the grade lower and the reduction in fuel somewhat more marked. After running a short time on mill iron without concentrate the furnace was changed to Bessemer, using New Bed concentrate, 10-mesh, 67 per cent. iron, as follows: Four tenths, 10 days; six-tenths, 4 days; eight-tenths, 14 days, and seven-tenths, 11 days; total, 39 days. During this time the furnace worked smoothly and regularly, with about the same increase of pressure and reduction of fuel as when using the Old Bed concentrate.

In conclusion, our experience seems to have demonstrated that with proper management there is no difficulty in using in the blast furnace at least 80 per cent. of high-grade concentrate, and that there is also, especially in the use of a large percentage of concentrate, an economy of fuel beyond that which may be due to an increase of iron in the mixture. This increased economy may be attributed to the comminution of the ore.

Table of Mixtures.

Days run.	New Bed.			Old Bed.			Mill.	Iron made.
	Concentrate	Run of mine	Pure.	Concentrate	Run of mine	Pure.		
9	2/14	2/14	...	2/14	2/14	...	2/14	} Mill.
5	2/14	2/14	...	2/14	2/14	...	2/14	
51	2/14	2/14	...	2/14	2/14	...	2/14	
29	2/10	2/10	2/10	2/10	2/10	...	2/10	} Bessem'r
15	2/10	2/10	2/10	2/10	2/10	...	2/10	
7	2/10	2/10	2/10	2/10	2/10	...	2/10	
73	2/10	2/10	2/10	2/10	2/10	...	2/10	} Mill.
9	2/10	2/10	2/10	2/10	2/10	...	2/10	
12	2/10	2/10	2/10	2/10	2/10	...	2/10	
8	2/10	2/10	2/10	2/10	2/10	...	2/10	} Bessem'r
14	2/10	2/10	2/10	2/10	2/10	...	2/10	
10	2/10	2/10	2/10	2/10	2/10	...	2/10	
4	2/10	2/10	2/10	2/10	2/10	...	2/10	} Bessem'r
14	2/10	2/10	2/10	2/10	2/10	...	2/10	
11	2/10	2/10	2/10	2/10	2/10	...	2/10	

Strikes are no longer popular. There have been too many failures and the losses have been severe. The catalogue of disasters includes the ill-advised "South-west" railroad strike, the Chicago "Stock-yard" strike, the "C., B. and Q." strike, the New York 'longshoremen's strike, the Reading Railroad boycott strike, the Reading and Lehigh coal miners' strike, the New York Central Railroad strike and the recent "coke" strikes in Southwestern Pennsylvania. All of these had the same history—all ran the same disastrous course inevitable to strikes without sufficient reason and to strikes supported by violence. They failed or they were put down.

The Mining Engineers

MEETING AT GLEN SUMMITT, PA.

Those who have observed what appeared to be the signs of waning interest in the meetings of the American Institute of Mining Engineers would have noted with satisfaction that alarmist views were not justified. There was a good deal of the old-time animation in the proceedings of the Glen Summit meeting held during the last week. The attendance was good, about 125 members participating, and, what is far more encouraging, the discussions, under the management of the president, John Birkinbine of Philadelphia, were animated and instructive.

Among those who were present during the meeting were John Fritz of the Bethlehem Iron Company, South Bethlehem; N. M. Langdon of Witherbee, Sherman & Co., Port Henry; E. V. D'Inwilliers of Philadelphia; Dr. David T. Day, United States Geological Survey, Washington, D. C.; Jerome L. Boyer, Reading, Pa.; Prof. R. H. Richards, Boston, Mass.; W. H. Morris, president Pottstown Iron Company, Pottstown, Pa.; Richard Peters, Jr., Wellman Iron and Steel Company, Thurlow, Pa.; Maunsel White, Bethlehem Iron Company, South Bethlehem, Pa.; Frank Firmstone, Easton, Pa.; W. L. Sheaffer, Pottsville, Pa.; H. J. Seaman, Coplay Iron Company, Coplay, Pa.; John H. Harden, Phoenixville, Pa.; J. C. Platt, New York; John S. Fackenthal, Glendon Iron Company, Easton, Pa.; E. G. Spilsbury, Trenton Iron Company, Trenton, N. J.; William Thaw, Jr., of Pittsburgh; Edward C. Huxley, Sturtevant Mill Company, Boston, Mass.; W. H. Hoffman, Croton Magnetic Iron Mines; Horace See, New York; W. T. Hungerford of the Ames Rolling Mills, Jersey City, N. J.; Washington Jones, Philadelphia; W. B. Cogswell, Syracuse, N. Y.; E. S. Moffat, Lackawanna Iron and Steel Company, Scranton, Pa.; Oliver Williams, Catsaqua Mfg. Company and Bryden Horse Shoe Company, Catsaqua, Pa.; Axel Sahlin, in charge of Erastus Wiman's mechanical interests, and J. Knapp, manager of the blast furnace department of the Pennsylvania Steel Company, Steelton, Pa.

Tuesday Evening's Session.

The first session of the institute was called to order on Tuesday evening by Eckley B. Cox, the chairman of the Local Committee, who resigned the chair to John Birkinbine, the president of the institute, who took the question of "Fuel Economy" as the subject of his presidential address. After the transaction of routine business, Prof. R. H. Richards of the Boston Institute of Technology was called upon for a paper entitled "A Hand Telescope for Stadia Work." He described an exceedingly ingenious new device for the measurement of distances. A prism is so fixed to the end of an ordinary telescope that it covers one-half of the object glass. When sighting at a graduated rod with the edge of the prism in a vertical position there are produced two images side by side. The telescope is then so turned that one image overlaps the other, the overlap of the bent image furnishing a measure of the distance. After some discussion, F. H. Newell of the United States Geological Survey described the apparatus used in the stream measurements now being made in the West as a preliminary to the study of irrigation and detailed broadly the results obtained.

Wednesday Morning.

The first session was opened with the presentation by G. H. Eldredge, United States Geological Survey, of a paper on the Florence oil field, which is located on the Arkansas River, near Cañon City, Col., and 30 miles west of Pueblo. There are four companies operating in the field, which covers a section 6 x 14 miles. Although oil was discovered in 1883 in an artesian well at the depth of 1250 feet, it was not until 1886 that operations were carried out on a more liberal scale. The source of the oil is the Pierre horizon. Of the wells sunk 57½ per cent. pay for the pumping. Last year the acreage production was 1200 barrels, and the wells could yield 2000 barrels per day of 31 Beaumé oil. Out of 300,000 barrels of crude oil there was produced last year 100,000 barrels of illuminating and 5000 barrels of lubricating oil.

Then followed the reading of the papers and the discussion which proved the event of the meeting, the general subject being

MAGNETIC CONCENTRATES,

their production and their use in the furnace. W. H. Hoffman of the Croton Magnetic Iron Mines led with the paper which we present in full elsewhere, followed by N. M. Langdon, on the "Use of Magnetic Concentrates in the Port Henry Blast Furnaces," which we print in full.

A communication was read by E. K. Landis on the "Sampling of Concentrates for Chemical Analysis," and a brief paper was presented by the same author on the "Determination of Iron in the Tailings from Magnetic Concentrates." It dealt with the fact that the tailings often contain minerals other than magnetite whose iron contents are counted as part of the loss, when, as a matter of fact, it is not available for furnace work. Mr. Landis gave a series of figures showing what percentage of the iron in Tilly Foster tailings was soluble in boiling hydrochloric acid. The president read a letter from T. R. Woodbridge, chemist for Witherbee, Sherman & Co., Port Henry, presenting data collected in his efforts to determine accurately how much of the iron in the tailings is present in the magnetite. This brought out the suggestion, by Dr. C. B. Dudley, that the Thoulet solution might be made available for the work.

A reply by Clemens Jones of Hokendauqua to a criticism by John Birkinbine of an earlier paper was taken as read. In reply to a question by Mr. Knapp, how much of the fine ore was carried out of the furnace by the furnace gases, Mr. Langdon stated that the fine dust amounted to 4 to 5 tons, about 1 ton more than usual when running on ordinary mixtures. The fine dust, it is true, proved richer, since it carried near the bottom of the down-comer about 50 per cent., as against 17 per cent., of iron. In all about 2000 tons of ore had been used.

Dr. Dudley referred to the troubles experienced in a furnace with which he was connected through the use of an ore containing a high percentage of fines. The principal unfavorable result obtained was in the variations of the silicon. Dr. Dudley seized the occasion to complain of the frequency of the irregularity in the silicon contents of iron delivered to consumers, and referred particularly to a low-silicon anthracite iron used for a special purpose by the Pennsylvania Railroad. He insisted that wide fluctuations were observed.

E. S. Moffat of the Lackawanna Iron and Steel Company reported that he had used magnetic concentrates for six years, and on the whole had not observed any greater lack of uniformity in the iron produced than had been experienced before that time. The total consumption to date of the Lackawanna Company, who were the first concern to use concentrates, was

80,000 tons, and although the size of the material employed fluctuated from No. 60 to $\frac{1}{2}$ inch, no peculiarity was observed. Usually one-twelfth to four-twelfths of the mixture were concentrates, and there has been no perceptible increase in the pressure. There was no considerable loss in the flues of the furnace, but it was found desirable, to avoid blowing away, in unloading particularly, to moisten the iron.

Dr. R. W. Raymond criticized the figures presented by Mr. Hoffman on the ground that they included no royalty, and that no account was presented for striping. He clung to the statement that mining and concentrating lean magnetic iron could not be a profitable industry, that it would be restricted to the treatment of waste dumps. He accepted the figures of the Croton Mines as proving the conditions at that locality to be exceptional, but was promptly met by the statement, made by T. Spencer Miller of the Lidgerwood Mfg. Company, that the cost of mining and handling ore at the Ogden Mines, delivered to the crusher, aggregated 38 cents per ton.

The discussion then took a turn in the direction of the best apparatus for crushing and the most favorable practical means of getting high duty out of Sturtevant mills and disintegrators. Incidentally William H. Morris, president of the Pottstown Iron Company, referred to Dr. Dudley's statement of the difficulty in obtaining low-silicon iron by reporting that at the Pottstown plant iron is currently made running from 0.4 down to a trace of silicon, with which he coupled the statement that the contents of that constituent are under the control of a furnace manager. The session closed with the presentation of a paper by B. E. Fernon of the Forestry Division of the Bureau of Agriculture, Washington, on "Government Timber Tests."

The Afternoon Session.

The afternoon session was opened by a discussion of a lengthy paper presented by A. E. Hunt of Pittsburgh on the "Tests and Requirements of Structural Wrought Iron and Steel," from which we shall print copious extracts. William H. Morris, president of the Pottstown Iron Company, opened the discussion by the following remarks on

TESTING IRON AND STEEL.

The increase in testing has worked a great injustice to the mills. They are required to handle their iron the second time and sometimes oftener, because it does not suit the inspectors to be there when it is made. Sometimes they are kept waiting several days and occasionally as long as a week.

Some men, when they first come into the field, know nothing about iron or steel or its manufacture, and some are young fellows sent there from technical schools at the expense of the mills. Worse still, the inspector has ceased to make a final decision on the acceptance of the material, as was the case when the business was first started, and now the engineers claim the right to throw material out at any time, even after it has been spoiled by punching and riveting and is only fit for scrap. In the handling of a large business it is necessary to load direct from the shearing bed, and in bulky, large articles, such as plate iron, this is particularly desirable, as the rehandling is very expensive.

Again, in regard to the number of tests, more and more are called for without showing any appreciable gain. When parties are working a certain kind of stock, one or two tests a day would certainly be a sufficient indication of its character, and this ought to satisfy any reasonable party. The surface inspection should be done by the mills, and they should be relieved at least of any annoyance in this part of the work. Why should the minimum and

maximum tensile strength be fixed as limits for steel, when no such thing is thought of for iron? If an engineer calculates his strain at 60,000 pounds, why should he find fault if he gets a stronger piece of steel, provided the other qualities are up to standard? Cold rolling, which Mr. Hunt criticises, was brought about by just these requirements.

In regard to the relative merits of open-hearth and Bessemer steel, the regularity of product is perhaps in favor of Bessemer, where it is confined to strictly one class of material. In open-hearth practice the time of tapping is judged by the melter, and this necessarily varies according to his judgment and that of his partner on the other turn. Delays in tapping are still another contingency. In the Bessemer, running on one grade with a constant mixture of metal and a regular quantity of blast by actual measurement, there is small room for irregularity, and any slight changes can be made by taking the tests from the next previous heat as a guide. In actual practice it has been demonstrated by this process that variations can be controlled in very narrow limits, and misfits kept below 1 per cent.

A good deal is said by Mr. Hunt in the way of a reflection on the honesty of the manufacturers in dealing with the inspectors and specifications, but these suspicions are largely brought out by themselves. Some inspectors come to a mill with the idea that they are hired as spies and naturally feel aggrieved if they do not find some irregular thing to report. In many cases irresponsible parties are sent out, held to rigid instructions, with no judgment and no right to use it, if they had it, who report to some theoretical assistants. Of course there is sure to be a hitch. No man is fit to have charge of inspection and testing who has not had some experience as a manufacturer. I have known of a case where an engineer took the position that he could inspect the material or not, as he chose, and that he could decide that the material was not fit to use even without taking the trouble of looking at it, and even did go so far as to attempt to condemn it.

It would be well if some specified thickness of metal could be established for test pieces, especially in steel, and this I think is the custom in England, as most soft blooms are sold on a guarantee of test at a $\frac{1}{4}$ thickness. The United States Government also recognizes the difference in materials at varying thicknesses in its requirements for boilers and hulls of vessels.

If the different bureaus could agree on one man at a works it would save a good deal of trouble to themselves and to the mills. Often five or six men come to test and inspect at the same time quite small shipments, and this with the time and traveling expenses is a heavy burden for the consumer to bear.

In regard to basic steel there is no reason why the chemical requirements should be any more rigid than for acid. It is a softer metal than that made by the acid process, and is better adapted for uses for which iron has heretofore been in vogue.

In heating, any experienced man can do as well, if not better, with soft steel as with iron. We have repeatedly heated soft steel slabs made by our special processes as hot as iron piles without any deleterious effects, and have also piled and welded the scrap from the plates and cut them up into nails without discovering any signs of the welds. We can get our phosphorus down below 0.01, and keep our manganese low without any signs of red shortness. We can have our tensile strength as low as 50,000 pounds, and, in fact, make a metal almost as soft as lead, and from this to any required degree of hardness.

In answer to Mr. Hunt's paper, I would make the following points:

1. Employ the usual good business judgment in dealing with manufacturers in whom you have confidence and this in turn will bring respect and confidence in the inspectors.

2. Where full tests are made regularly by the manufacturers accept their tests in lieu of an excessive number of your own.

3. Allow the mills to make their own surface inspection.

4. Always select a practical man for inspector, one who has had experience in working iron.

5. As far as possible avoid a duplication of tests and save expense for your customers and yourselves in this way.

6. Have some standard thickness as well as width for your test pieces.

7. Make your specifications as simple as possible.

8. Omit all limits to ultimate strength and accept any material which is equally as good as the specifications call for.

Mr. Morris dwells with special emphasis upon the tendency shown lately to narrow the limits of allowable range of tensile tests. Formerly a difference of 10,000 pounds between maximum and minimum was admitted, now it has been narrowed to 7000 and 8000 pounds and there are indications that the next step will be to cut the range down to 5000 pounds.

Oliver Williams, president of the Catsauqua Mfg. Company, insisted that inspectors as a class have very much improved during the past few years. One of the greatest difficulties which mill men must contend with is that there are no settled specifications. As an instance he cited the fact that in one week there were inspected four lots of plates at his mill in which the requirements ranged from 46,000 up to 52,000 pounds for tensile strength and 8 to 15 per cent. elongation. During the period of enforced economy the railroads have steadily raised requirements, and yet they will not pay for higher quality. Mr. Williams insisted that never before did the mills, generally speaking, make as good an iron as they are producing to-day. He pleaded for settled specifications, very nearly like the standards of the bridge makers, which could be met, and could be met honorably.

Dr. C. B. Dudley of the testing department of the Pennsylvania Railroad held that the keynote of the situation lay in the fact that any inspection is made at all. When manufacturers know that material is to be tested the quality will be better than if no testing whatever is done. The chief value of the Testing Department of the Pennsylvania Railroad is that it exists at all. The question must be faced from the standpoint of the user. The engineer who knows the disastrous effects of failure naturally hesitates. He recognizes the desire of the manufacturer to make money, and that the user must take risks. Some manufacturers incline to the opinion that engineers work the specifications out of their own heads. And yet there is a good deal behind these specifications. The method of procedure at Altoona is to first examine the causes of failure. Thus recently in working out fire box plate specifications 60 worn-out boilers were examined, the material tested, and 30 analyses made. With these data at hand the work of drawing up the specifications began. They were sent to the leading manufacturers for critical examination and to all the master mechanics on the road. The plate specifications have thus been under discussion for 16 months. Often special tests are made to introduce modifications. Yet with all care it is sometimes found necessary to revise specifications in nine months. It is proposed to introduce a homogeneity test. A piece of metal is nicked on one side, placed in a vise and

bent over with a hammer until it breaks. The fracture thus obtained discloses the presence of what were originally blow holes rolled out, which are particularly dangerous in fire-box steel, which is exposed when in use to a temperature of about 3000° on one surface, while it is only 275° to 300° on the other. The break in the continuity, due to the flattened blow holes, interferes with the transmission of heat, causes the particular spot to become overheated and makes it expand until it becomes a blister, which is the principal cause of the putting out of service for fire-box plates.

In dealing with the question why an upper limit in tensile strength is called for, Dr. Dudley cited the case of some bridge rods, in which the use of high steel led to bitter experience. For iron rods which proved too weak were substituted 1½ inch open-hearth steel rods with a tensile strength of 96,000 pounds and 22 per cent. elongation. Yet they broke, although the static load was only 8000 pounds. The rods passed through angle blocks with nuts at right angles to the rods. The whole load was on the one side of the rods, and they broke because their excessive stiffness with high tensile strength would not allow them to bend, as the iron rods had readily done.

Oliver Williams reported a case in which his firm had offered to guarantee to a leading railroad axles capable of resisting double the usual requirements, which are two blows of a 1640 pound weight from a height of 10 feet and three from 15 feet. He had offered to make metal to resist a drop test of double the weight and double the height provided an advance of 1 cent per pound were paid over the price for ordinary quality. Yet the offer was refused.

The session closed with the presentation by R. Van A. Norris of Wilkes-Barre, Pa., of a paper on "Centrifugal Ventilators."

Wednesday Evening.

E. G. Spilsbury of the Trenton Iron Company, Trenton, N. J., placed before the meeting some notes on a cable hoist and the use of the Elliott locked rope. He presented two instances of their use, one of a cable tramway across the Susquehanna River near Williamsport, for the Glen Union Lumber Company. It was employed to carry loaded railroad cars from one side of the river to the other. The second was a tramway for the Gauley Mountain Coal Company of West Virginia.

There were presented by title papers by Karl Eilers, on "Electrical Locomotives in German Mines," and M. B. Holt on "Electricity in Mining," in connection with which H. C. Spaulding of the Thomson-Houston Company, Boston, showed photographs of what is considered the heaviest mine locomotive. It is rated at 60 horse-power, weighs 21,600 pounds, and has an armature speed of 1240 feet, and travels at the rate of 10 miles an hour. Its height is 3 feet 3½ inches above the rail, its width 6 feet 3½ inches, and its length 12 feet 6½ inches. Mr. Spaulding also described a large electric Knowles pump, designed for a 1500 foot lift, which under trial showed an efficiency of 74 per cent.

Axel Sahlin of New York gave an interesting description of

THE UTILIZATION OF PUDDLE SLAGS AND HEATING CINDERS FOR PAINT STOCK,

which is in use at Boonton, N. J. The principal problem in connection with the new method was to obtain an apparatus capable of grinding material very finely. This was secured in the Cyclone pulverizer. This puddle cinder is ground and is floated through the aperture of the pulverizer into an oblong chamber, at the opposite end of which is a fan. In this first chamber the fine dusts settle, the

coarser being deposited near the entrance of the flue. Along the bottom of the chamber are two chain conveyors, one carrying from and the other to the end. Every 2 feet is a gate which may be opened at will. From the chamber the dust which has not settled is delivered by the fan to another room, and it is this which constitutes the raw material for the paint stock, the coarsest particles being capable of passing a 225-mesh sieve. The raw material is a dark gray neutral tint, which slight additions of pigment will considerably affect. This final product is used direct, while the coarser material is mixed in the proportion of 1000 pounds with 200 pounds of sulphuric acid, worked together and placed in a bin to sweat, remaining there for four days. Then it is calcined for four hours in a furnace, producing a dark black to light flaky material, which goes to the Cyclone pulverizer and forms the pigment. Mr. Sahlin reports that the cost of grinding is only 17 cents per ton.

The evening closed with the presentation off-hand on the part of Eckley B. Coxé of a thorough review of the principles underlying the utilization of the smallest sizes of anthracite coal. As the first preliminary consideration Mr. Coxé insisted upon the fact that anthracite coal burns only on the surface, that therefore it must be prepared for the market by breakers in such a manner that the proper air spaces are obtained in proportion to the different sizes of the lumps to be burned. Good sizing is an essential condition. It has been observed that some anthracite coals possess characteristics which influence their burning so that in large sizes they do not burn well, while they ordinarily do so when reduced to small pieces. This, Mr. Coxé explained, is due to the fact that the ash of some coals clings to it. When such coal is reduced to small pieces the whole of the small lump is consumed before the ash layer becomes thick enough to interfere with combustion. A good deal of false information has reached the public in regard to the utilization of the old waste banks which disfigure the anthracite region. The quantity of coal in many of these banks is far less than would appear at first sight, because they often occupy positions on steeply sloping ground. Some of the older banks contain a good deal of larger sizes which were not utilized at the time when the colliery producing them operated. One of the particular points to be considered in working them is that the dust must be removed from the smaller sizes, since it clogs up the interstices of the coal. Mr. Coxé has experimented with an admixture of bituminous coal to the small sizes of anthracite and has found that in some cases such an admixture does not serve a useful purpose. Thus he burned No. 3 buckwheat with 10 per cent. bituminous coal and during a 12-hours' test found the evaporation from and at 212° to be 6.54 pounds when using 10 per cent. bituminous coal, and 6.60 pounds when burning anthracite buckwheat alone. In this case the bituminous coal was not sufficient in quantity to cake the fuel and yet disturbed the draft. Another point in connection with the smaller sizes of anthracite is the enormous quantities of iron pyrites which are contained in them. Mr. Coxé presented a series of data showing the percentage between slate and iron pyrites in different sizes of coal, and insisted upon the necessity of thoroughly jigging the small sizes of anthracite in order to get rid of the pyrites. The first step in the preparation to jig them must be thorough sizing. He reported that anthracite can be burned down to ¼-inch with satisfaction, provided the effort is not made to burn more on a given surface of grate than is suitable for it. In other words, when using the finest sizes of anthracite coal the

steam plant must be greater. The sizing itself depends upon the proper amount of water, the speed of the screen, the pitch of the screen plate and the quantity of coal delivered to it.

E. G. Spilsbury of Trenton reported the result of some experiments conducted by him to compare the efficiency of oil and of buckwheat No. 2 as a fuel. With oil at 2.1 cents a pound, and coal, delivered at the boiler, at \$1.94, the proportion in cost was 5 to 7 in favor of the buckwheat coal. Wm. H. Morris added his testimony to the effect that the employment of fine sizes of anthracite so reduced the boiler capacity that the additional labor and the cost of larger plant wiped out what profit there was in it. He made an effort to utilize the fine anthracite dust from the screenings of the blast furnace in his gas producers, but did not find the result favorable.

At the invitation of Albert Lewis, a leading lumber merchant of the Wyoming region, the members of the institute spent Thursday in a trip to Harvey Lake, and in the evening accepted the hospitality of Gen. Paul A. Oliver, who had invited the party to a camp fire at Laurel Run. Friday was devoted to a visit to the breakers of Coxé Bros. & Co., at Drifton and Oneida, famous throughout the coal region as the only iron structure of that character.

NEW PUBLICATIONS.

DESCRIPTIVE TREATISE ON CONSTRUCTIVE STEAM ENGINEERING, EMBRACING ENGINES, PUMPS AND BOILERS. By Jay M. Whitham, M.E., C.E.; John Wiley & Sons, New York, publishers; 900 pages; illustrated. Price, \$10.

The author of this book has admirably succeeded in presenting a clear and concise description of the constructive features of the modern steam engine, pump, boiler and the essential accessories. The design is not discussed, the matter being founded upon the best and latest practice, and may, therefore, be considered as descriptive of the best designs now on the market. The book first gives a brief classification of the various types of engines, these being so selected as to serve as types from which, through various modifications, the long line of engines now being built has arisen. Next follows a chapter on heat and steam, defining the principles of steam, embracing discussions of thermometers, calorimeters, byrometers and the necessary formulas of calculation. Next is given a description of the steam engine cylinder, piston, piston rod, valve and valve stem, the text being so selected as to cover all the best known forms of engines. From this the author takes up the subject of crosshead, wrist pin, connecting rod, link, thrust and propeller shafting, couplings, bearings, fly wheel, frame and foundation, pursuing the same policy of typical selection as at first followed. One chapter is devoted to the indicator, describing the various rigs and explaining the diagrams and planimeters. This is a valuable treatise on the indicator, giving as it does the best forms of that instrument now used and explaining in a very clear way how best to use it and how to derive results from the cards, or in other words, the practical application of the instrument. The next chapter discusses Zuener's method of analyzing valve gears, as applied to the design of Slide, Meyer, Gozenbach and other valves, with examples. The description of the eccentric and the various types of valve gears and governors is well selected and exhaustive. A chapter is now devoted to the compound, triple and quadruple expansion engines, after which condensers, pumps and pumping engines are considered. Then comes a chapter on the miscellaneous attachments and minor details of an engine,

embracing stop, throttle and relief valves, stuffing boxes, belting, lubricants, &c. Next is imparted instruction in the management of engines and pumps, best method of conducting trials and descriptions of dynamometers. The general subject of boilers is opened by a discussion of the theory of combustion and the various types of boilers in use, after which their constructive details and strength are treated. The last chapter relates to all the appendages and accessories of boilers, their deterioration, management, &c. The book, taken as a whole, may be considered as a well-compiled description of the modern steam engine and all belonging to it, arranged in such form as to be readily accessible, and since all theory and all useless discussion is omitted, the account given may be taken in each case as descriptive of actual practice. Not the least valuable feature of the book is a very complete index.

POOR'S HANDBOOK OF INVESTMENT SECURITIES. H. V. & H. W. Poor, New York. Price, \$2.50.

The second annual edition of Poor's "Handbook of Investment Securities" has just been issued, containing substantially the same range of information which was first arranged in so convenient a form for the American public. The work comprises chapters showing the dates on which bond coupons of all railroads are payable, the dates of their annual meeting and the dividends paid for a series of years. So far as it is possible, full data are given concerning municipal and township indebtedness, county indebtedness and State debts and liabilities. The range of stock and bond values in the principal exchanges of the country are presented for the years 1886 to July, 1891. An interesting feature is a relatively short list of corporations which, by general consent, are termed "industrial securities." We observe, among others, the American Stove and Range Company, the American Wringer Company, the Atlas Tack Corporation, Colorado Coal and Iron Company, Grand River Coal and Coke Company, Minnesota Iron Company, National Cordage Company, North Carolina Coal and Iron Company, New York and Perry Coal and Iron Company, Simmons Hardware Company, Tennessee Coal and Iron Company and the Woodstock Iron Company.

PERSONAL.

B. G. Clarke, president of the Thomas Iron Company and of the Lackawanna Iron and Steel Company, is soon expected to return from a trip to North Carolina.

C. C. Martin, supervising engineer of the Brooklyn Bridge, has declined a call during the summer from the trustees of the Rensselaer Polytechnic Institute, Troy, N. Y., to become its director.

O. B. Bradford, for the past six years paymaster in the Beaver Falls Mills of Carnegie, Phipps & Co., Limited, at Beaver Falls, Pa., has resigned his position.

Fred. Heron, general manager of the Phoenix Iron Works, returned early last week from a trip to Europe and has assumed full charge of the works at Phoenixville, Pa.

It is announced that J. H. Springer, superintendent of the Niles Tool Works, Hamilton, Ohio, has tendered his resignation to the company, to take effect January 1. It is understood that Mr. Springer will go to St. Louis, where he will take charge of a large works similar to the Niles.

The Solvay Process Company of Syracuse, N. Y., the great manufacturers of soda by the Solvay ammonia process, are

putting up a number of coke ovens to experiment with ammonia recovery from coke oven gases. As large consumers of ammonia, they desire to test the question what future there is in coke manufacturing as a source of supply.

The property of the National Forge and Iron Company will be offered at public sale on the 22d inst., at East Chicago, Ind., consisting of real estate, rolling mills and large quantities of coal, pig iron and other material.

Tin-Plate Consumers' Association.

With a view to obtaining reliable information concerning the present status of the tin-plate industry in this country, a meeting of a number of prominent consumers of tin plate was held in the rooms of the Fulton Club, Fulton and Gold streets, New York City, on Wednesday, October 7. The meeting was the result of the efforts on the part of C. F. Trench of the firm of C. F. Trench & Co. of this city, the well-known tin-plate brokers. Mr. Trench for some time has been engaged in getting the opinions of leading tin-plate consumers throughout the country respecting the organization of an association for the purpose named. The object of the meeting, as stated in the call, was "to discuss the propriety of organizing an association of tin-plate consumers for the acquirement of reliable information respecting the progress and development of the manufacture of the article in question; the careful watching of all legislation affecting the interests of consumers of tin plate; the compiling of reliable statistics of the trade and such united action in defense of our own interests as may be thought necessary."

Among the large consumers represented at the meeting were H. C. Caupen & Co., Baltimore; The Louis McMurray Packing Company, Baltimore; Dickey, Tansley & Co., Baltimore; Wm. G. H. Gluck, Baltimore; Wallaw & Nijetje, Baltimore; W. T. Hemingway & Co., Baltimore; Martin Wagner & Co., Baltimore; Jas. E. Sausburg, Son & Co., Baltimore; Miller Bros. & Co., Baltimore; Essenberg & Niss, Baltimore; Grellet & Mann, Baltimore; Kirwin & Tyler, Baltimore; R. Tynes Smith Can Company, Baltimore; W. W. Boye & Co., Baltimore; Black & Krebs, Baltimore; Armour & Co., Chicago; E. T. Mason & Co., Chicago; A. H. Pierce & Co., Chicago; Illinois Can Company, Chicago; The Central Stamping Company, New York and St. Louis; E. P. Breckinridge & Co., New York; G. C. Napheys & Son, Philadelphia; Geo. D. Molloy & Sons, Philadelphia; David Block, New York; Wm. Vogel & Bro.; John Roebuck, Brooklyn; H. B. Haigh, New York, and Henry W. Lamb, Boston.

The meeting having been called to order Henry W. Lamb of Boston was chosen temporary chairman and Robert Ganz temporary secretary. A discussion of the present tin-plate situation followed, those present expressing their views of the desirability of forming an association for the collection of reliable information on the American industry. The following is a copy of the constitution, as adopted at the meeting:

I.

The name of this association shall be "The Tin-Plate Consumers' Association of the United States."

II.

The object of the association shall be to further the interests of American users of tin plates.

III.

The officers of the association shall be a president, two vice-presidents, a treasurer and a secretary, who, with four others, constitute the Board of Directors and shall hold office for one year or until the election of their successors.

IV.

Any individual, firm or company in the United States interested in the purchase of tin plates may become a member of this association on being approved by the directors and paying the annual dues.

V.

This constitution may be amended by a majority of persons present at any meeting of the association, provided notice of such amendment be inserted in the call for the meeting.

After the adoption of the constitution the following officers were elected: President, Henry W. Lamb; vice-presidents, D. Willis James, Jr., and H. B. Haigh; secretary, Robert Ganz, and treasurer, C. F. Trench. The Board of Directors chosen was as follows: E. P. Breckinridge, John Roebuck, Stephen A. Ginna and R. T. Smith, together with the officers of the association as above mentioned. Congressman-elect Bunting, president of the New York Packers' Association and vice-president of the National Packers' and Canners' Association, was present and spoke briefly on the need of some such bureau of information as the organization proposes to establish, and which would give reliable data on the state of the industry in this country from a non-partisan standpoint.

The Board of Directors are to prepare by-laws for the organization and report at the next meeting, which will be at the call of the chair. It was the sense of the meeting that the organization was to be incorporated, and upon this point the directors were also to report at the next meeting. As stated above, the object of the association is to investigate the present tin-plate situation and furnish the members all information obtained respecting the tin industry. The meeting last Wednesday was simply to organize, and further steps cannot be undertaken until the Board of Directors have come together and decided upon what course of action to follow.

The Cleveland Iron Mining Company are asking for bids for another steamer of about 1200 tons, to engage mainly in carrying coal and iron ore.

The Whaleback Vessels.

A. D. Thomson of the American Steel Barge Company has been interviewed by the Chicago *Inter-Ocean* and makes a number of very interesting statements outlining the policy of that company, and showing the immensity of the operations they contemplate. He says:

Within a year we shall expend some \$3,000,000 in pushing the enterprise, and we shall manufacture boats just as rapidly as they are needed. We shall make them for our own use, to be under our own control, and shall also sell them. Among the earliest of our lines we shall establish one between New York and San Francisco by way of the Cape. The Wetmore, which made our first transatlantic voyage, has returned from Liverpool, and is now ten days out from New York carrying material for our docks and shops on the Pacific Coast. At Everett, on Puget Sound, we shall manufacture boats for the trade with Australia, China and Japan. A similar manufactory will also be established on the Atlantic Coast. We shall also establish a line from Chicago to run northward on the great lakes. It is proposed to construct the first boat for this line on an elaborate scale, and to have it running during the World's Fair. This line will be for passenger service. In time all the transatlantic boats will be whalebacks. Newspaper dispatches stated this week that the North German Lloyd had already contracted for them, but as yet we have heard nothing of it. That and everything else will come in time, however, for the whaleback is the most economical in construction and in operation. A whaleback of 850 horse-power, carrying 3000

tons, will equal in speed an ordinary boat of the same tonnage and with 1800 horsepower.

THE WEEK.

A canal to connect Jamaica Bay with the Great South Bay, on the south shore of Long Island, is spoken of as probable. Navigators would no longer be compelled to go away out around Rockaway Beach, and it would open up a water route to many important points on Long Island which at present have none. The saving in rough freight, it is asserted, would in a single year more than pay the cost of the canal.

The Congress of Paraguay has approved the project for the construction of a railway to be known as the Asuncion and Santos Railway. This will be the means of opening direct communication by rail from the sea at Santos, Brazil, to Asuncion, the capital of Paraguay, thus saving thousands of miles in both sea and river transportation, and shortening the time between Paraguay and the United States from ten to twelve days.

Aluminum has been substituted for cast iron in the specifications for the dome of the tower of Philadelphia's new City Hall. It will save the constant expense of painting and reduce the weight of the tower about 400 tons.

An important submarine cable soon to be laid is that between Pernambuco, in Brazil, and Senegal, in Africa. It is a British company that is the promoter of this project, and recent advices give assurance that, unless there be some unexpected obstruction, the line will be in operation within the next half year.

It is stated that the German Government has recently placed an order in the hands of agents in the United States for a large quantity of pure aluminum, to be used in articles pertaining to the accouterments and field uses of the German army. This order calls for some 85 tons of the metal.

A scheme is on foot to build and thoroughly equip a trunk-line railroad to connect the Gulf of California and the Gulf of Mexico.

The Secretary of the Navy favors building, besides a few large battle ships, a numerous fleet of small cruisers for police purposes, to cost not much over \$300,000 each.

The Nicaragua Government proposes to build bridges and make other improvements calculated to develop the industrial resources of the country.

The great drainage works at Marseilles, France, were opened 8th inst.

Minneapolis mills last week turned out 194,160 barrels of flour, the largest production on record, and shipments were correspondingly heavy.

The Report of the distribution of the estate of Theodore Rogers, of the Rogers Locomotive Works, who died in 1872, shows good management on the part of the executors, who were authorized to use their discretion as to the management and time of division of the estate. Its appraised value in 1872 was \$192,376, but it was increased to nearly \$900,000 before the distribution was made in April of this year.

The combined wheat and flour exports from San Francisco during the last three months are equal in value to \$8,000,000. The average price of wheat sold has been \$1.64 per cental, an advance of 27 cents, compared with last year.

Philip D. Armour, under the name of the Franco-American Patent Can Opening

Company, has entered suit in the United States Circuit Court at Chicago against the Fairbanks Canning Company, the majority of the stock of which is owned by Nelson Morris, his son and F. E. Vogel. It is charged that the defendant company are infringing upon the complainant's patent for making sheet metal cans in which meat is packed.

The Manchester, England, *Guardian* is alarmed by the discovery that the City of Paris and others of the fastest subsidized steamers are largely owned in America, and, as they are subject to the orders of the British Admiralty, asks on which side of the contest would they be found in the deplorable event of war with the United States.

Two plans are now uppermost for consideration before the New York Rapid Transit Commissioners, and it is probable a definite decision will be reached in a few days. The majority favor the plans submitted by the commission's senior engineer, W. E. Worthen, which embodies a four-track tunnel, all on the same level and deep enough to avoid any future disturbance of the street surface. Mr. Parson's plan, which is preferred by many, has four tracks set in pairs, one above the other, the upper tracks to be for local and the lower for express service, with a gallery or chamber between them of sufficient size to contain all the pipes and wires now located beneath the surface of the street. To get to the platforms for his local trains passengers would not have to do so much climbing as is required in Mr. Worthen's tunnel. But to reach the platforms of his express trains the distance will be something greater.

The products of Alaska exported during the year and their value are stated by Governor Lyman E. Knapp, in his annual report, as follows: 688,332 cases of salmon, valued at \$2,753,328; 4150 pounds of ivory, worth \$9507; 231,282 pounds of whalebone, worth \$1,503,333; 14,890 gallons of whale oil, worth \$4467; 1,138,000 codfish, \$569,000; 7300 barrels salted salmon, \$73,000; gold and silver bullion, \$1,000,000; 21,596 fur seals taken under lease, \$647,880; 60,000 skins taken by poachers, \$1,800,000; other furs and skins, \$450,000; curios, \$25,000; other products, \$106,000. Total, \$8,941,515.

Labor leaders are rising to their own occasion in New Zealand. A bill for the payment of members has already passed through several stages in the Antipodean Parliament—for raising the salary of each member to \$1200 per annum. This bill was introduced, and is being pushed forward at the instance of the labor members, who insist that they shall not be liable to attachment by any court or seizure by any process. Besides the privileges of drawing good salaries and having legal permission to run into debt without being troubled with anxiety as to the payment thereof, these disinterested legislators hold free passes over the State railways. All this liberal treatment of themselves occurs in the same session in which there have been wholesale dismissals of civil servants on the ground of economy, and in a colony terribly overburdened with public debt.

The Spreckels Steamship Company have been organized, at Philadelphia, and will begin competing on November next for the North Atlantic Continental trade. The firm have no intention of building vessels, but will continue to charter a fleet. To the sugar business they will add general cargo.

The Supreme Court at Columbus, Ohio, is hearing arguments in the celebrated case instituted by Attorney-General Watson against the Standard Oil Company, to oust them from their charter rights.

Joseph H. Choate of New York is among the distinguished attorneys who represent the defense.

The Farmers' Alliance will build a mammoth wheat elevator at Duluth.

A deal was consummated in Santa Fé, New Mexico, on Saturday, whereby R. C. Kerrens of St. Louis, S. R. Elkins of West Virginia and several others secured control of the Cerrillos Coal and Iron Company.

Another great railroad tunnel is to be dug through the Alps to connect the Jura-Simplon Railway Company's line, which now terminates on the north at Brigue, with Domo d'Ossola, on the south in Italy, the existing terminus of the Italian-Mediterranean Company's line. It is estimated that the total cost of the tunnel and its approaches will be \$15,000,000.

The important cases before the Supreme Court, one of which involves the validity of the McKinley Tariff act, are likely to be delayed by the lack of a full bench.

The Poughkeepsie Bridge and the railroad system connected with it show a regular and encouraging increase in traffic.

Several of the Mexican States have decided to establish permanent sample rooms for the exhibition of their resources and products in London, Havre and New York.

There are this season comparatively few arrivals at New York of tea steamers via the Suez Canal, the Pacific Coast steamers having made considerable inroads into the usual course of trade.

Argentine refrigerator steamers in the frozen-meat trade are successfully exporting frozen fish caught in interior lakes.

The National Boiler Inspectors' Association, which has been in session in St. Louis, Mo., adjourned on Friday to meet at Philadelphia next fall. Resolutions were passed recommending the passage of laws looking to the uniform inspection of steam boilers.

Long Span Drawbridge.

Alfred P. Boller has designed a drawbridge, 408 feet long, to be erected over the Harlem River just south of McComb's Dam Bridge, New York City. It will be 67 feet wide, including the foot walks, and over 40 feet wide on the driveway. On the north side there is to be an approach 331 feet long, running over the New York Central Railroad tracks, and a 1600-foot extension to Jerome avenue and 162d street. The viaduct is to be about 1600 feet long. The extreme length of the new work will, therefore, be about three-quarters of a mile. There is, in addition, a 250 foot approach to be made to connect the new bridge with the thoroughfares from the city centering at the south end of the bridge.

The new bridge will be 34 feet above mean high water, which is about the same elevation as the old bridge. The shore piers will be of cut granite, with a watchman's tower at either end. The piers will each be 100 feet long at the foundation, and recede toward the top. The piers will be pierced by long arches, affording room for a broad stairway down to boat landings at the bulkhead line. The center pier will support the draw and hold the machinery for running it, will be circular and 60 feet in diameter. The draw span will be 24 feet high at the shore ends, and rise in graceful curve to 62½ feet in the center. The estimated cost of the bridge is \$1,350,000, and of the approaches \$600,000.

The total debt of the Dominion September 15 was \$235,425,182, showing a reduction of \$2,372,491 since June 15.

The Iron Age

New York, Thursday, October 15, 1891.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, - - - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS - - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

The Western Iron Trade.

In entering upon the last quarter of the year the fact is undeniably apparent that the condition of trade generally is not up to expectations. It has not reached the volume anticipated, nor have prices shown the strength they should. The heavy crops, the profitable prices for cereals and the large demand for export have brought prosperity to the Western farmers, and even the marketing of next year's crops at good prices seems to be assured by the extinction of reserves all over the world. And yet this bright prospect has influenced business very unevenly, some branches halting and hesitating, and actually showing weakness. The tendency of Americans is to speculate on the future, and they are often charged with too great rashness in making preparations in advance for expected business, but thus far this year they have shown unwonted conservatism and seem disposed to wait until the full force of the incoming tide of prosperity is felt.

We have remarked that business is being influenced unevenly by the prosperity of the farmers. This is the case in a most marked degree. The manufacturers of agricultural implements never experienced such a demand as they have had this year, and as is foreshadowed next year. Their consumption of iron and steel is surpassing their own estimates, which allowed liberal margins on previous seasons. The mills making a specialty of this class of work are extremely busy and find specifications rolling in on them at an unexpected rate. The wagon makers were never more driven than now, and those who had but lately increased their facilities to cover future growth find themselves already cramped for room. The immense business of the manufacturers of farm machinery and vehicles has thrown an increased trade into the hands of the Western heavy hardware jobbers. Their stocks of bar iron and steel are being drawn upon to meet the necessities of manufacturers whose mill contracts are not being filled as promptly as they should be. Stove manufacturers, whose Western trade fluctuates with the purchasing power of the farmers, report the largest demand they have had for years, while merchants in the Northwest are now discounting their own bills instead of asking for extensions.

These illustrations will suffice for the bright side of the picture. Now, on the other hand, the iron and steel manufacturers whose trade depends largely on the railroads are not driven to anything like

their capacity, although the Western road are doing an enormous business in both freight and passengers. Rolling mills making a specialty of car iron are in need of orders, and at least one large Western mill will probably shut down soon if the trade does not improve, although its opportunities for securing work would seem to have been improved by the recent failure of a competing mill in the same locality. Carbuilders are offering special inducements to secure orders for cars to keep their force of hands employed during the coming winter. Makers of coke pig iron have experienced an improved demand from the quickening of general trade, but they find it a matter of difficulty to advance prices above the level reached during the summer. Charcoal pig iron is again "in the dumps," after a brief period of improvement, and awaits activity in the car-wheel trade to restore it. Wire products were never so cheap as they now are. Both wire nails and barb wire have suffered heavy reductions within the past month, and while the lower prices of the latter may be due to special causes, still it may be conceded that a reduction would not have been made if trade had been up to its normal volume. Old material, such as iron rails and scrap, have receded in price in September and October, contrary to all precedents.

Examining the situation carefully, and analyzing the causes operating, the line seems to be sharply drawn between those branches of trade depending on the agricultural interests and those requiring a condition of financial ease in the money centers. The influence of the shaking up which the money market experienced just a year since has not yet been overcome. The Western banks report ample funds for use in moving crops and supplying legitimate commercial wants, but say they have nothing to spare for speculative enterprises. New schemes of whatever kind, but especially railroad schemes, are forced into the background, and railroad bonds are of slow sale, excepting only those of roads of the very highest standing. The rude shock given to public confidence last fall is still felt, and perhaps will continue to be felt until gold imports have swollen to a considerably greater volume than they have yet reached. Recuperation has set in, and our National finances are in a fair way to be restored to their usual healthy condition, but the process is a much slower one than had been anticipated in the spring. The last quarter of the year is expected to show a decided improvement in the demand for all kinds of iron and steel and probably an enhancement of values; as, in the nature of things, the prosperity of our agricultural interests and the favorable condition of our international exchanges cannot long continue without exerting a widespread influence on general trade.

The autumn boom in the stock market that followed close upon the discovery that the country this season has been favored to an extraordinary degree in the grain and cotton crops operates directly

to the advantage of steel and iron manufacturers, by creating a market for American securities, which thus become convertible into ready money at advanced prices, and provide the means for renewing rails and purchasing rolling stock. Foreseeing the need of ample equipment, several railroad corporations are promptly in the market with new issues of securities. Railroads in all directions begin to feel the pressure for transportation, and the close of navigation will be the signal for still more urgent demands. The Chicago, Burlington and Quincy Railroad, which directly intersects the grain region, proposes to expend \$2,000,000 for betterments. One of the Pacific companies has been admonished that the purchase of rails cannot longer be deferred. The Louisville, New Albany and Chicago Company, the Lake Erie and Western are also providing funds for contemplated improvements, and the Hocking Valley Company will issue \$2,500,000 of stock, a part of which will go for new equipment. All these are signs of encouragement for iron manufacturers and by the time the corn is harvested and the cotton picked, when the benefits of large harvests are actually realized, better things may be expected.

The Tin-Plate Outlook.

It has been the popular estimate that the consumption of tin plate in this country of late years has been between 5,500,000 and 6,000,000 boxes annually, or 450,000 to 500,000 boxes per month. This estimate is derived chiefly from the volume of importations and such information as might be obtained regarding the amount of stock carried over at the close of each year. In the absence of anything better it has served as a basis of calculation as to stocks on hand at certain intervals. How closely it comes to the actual movement is not clear, and at the present time, when complications or uncertainties resulting from the operation of the new tariff are studied with more than ordinary concern by a variety of interests, the lack of reliable data is lamentable, since such statistics would be of especial value on both sides of the Atlantic.

The general belief is that the amount of tin plate carried over at the close of the calendar year 1890 was unusually light, and that importations during the year ending July 31 exceeded those of the previous year to the extent of less than four months' consumption. In other words, the early consignments by foreign manufacturers and other interests that have sought to gain the utmost advantage from the increase in duty are believed to involve not more than 1,380,000 boxes above the average shipments. The bulk of this increase, it is worthy of remark, was in the movement during the last four months in which entries could be made at the old rate of duty.

In some lines canners of vegetables have not equaled last year's work. In others there has been a considerable gain, however, and the pack of fruits, it is a matter of record, has been larger the past season

than for several years. The canning of meats, a very important industry, was larger during the fiscal year than ever before, and the packing of petroleum in tins was fully up to the average. Doubtless fewer plates have been used for flues, roofing purposes, &c., owing to the embargo upon building operations due to late financial disturbances, but the loss in that line is not a really serious one. In short, the inference is warranted that aggregate consumption has been well up to the average since the beginning of the year, making due allowance for cans carried over from last year in some sections and the shortage in the pack of a few lines of canned food products this season.

Spot prices for bright Charcoal and some varieties of Terne plates are now on a parity with those current in the foreign market. It is a reasonable presumption, therefore, that surplus supplies of those plates have been very closely worked off. Coke-finish plates of sizes specially adapted for stamping purposes also command prices on a level with foreign cost. Ordinary Coke-finish plates are still to be had in this market at prices 10 cents to 15 cents per box below European manufacturers' quotations, however, and surface indications, at least, are that the accumulation on this side of the Atlantic, such as it may be, is of the last mentioned varieties and some kinds of Ternes.

That canners of fruits and vegetables are practically out of the market and will be until next season is the fact, since there will be little doing in that line after the end of the present month. Oil and meat canners will doubtless use a good many plates, but, enjoying as they do a refund of duty on plates used in the manufacture of packages for goods exported, those interests are unlikely to figure as heavy buyers of spot goods for some time to come. Under the new duty the refund is increased 9 per cent. and the net cost to the packer of export goods is reduced in even greater proportion, but whether this will lead to a heavier foreign trade is problematical.

Up to the present time there have been only moderate purchases of Charcoal plates for future delivery, although spot prices for the same, as noted above, are on a parity with the foreign market rates. Coke plates have been taken to the extent of about 250,000 boxes by consumers who have a large export outlet for their goods, but in very limited quantities by other buyers, and the appearances are that general interest in futures will lag until spot supplies are reduced to a minimum.

Foreign manufacturers are at present operating only about 40 per cent. of their mills, and a portion of those on short time. They added to their supplies last month about 70,000 boxes, but refuse to grant any concession on price, owing partly to a rise in the cost of tin-plate bars. They act as though strongly committed to the belief that Coke plates and Ternes, like Charcoal tins, must eventually advance in this market to the parity of present foreign values. Except in the directions above indicated, home buyers manifest remarkable unconcern, however,

and it depends a good deal upon the extent of spot supplies and the endurance of manufacturers whether Mahomet will go to the mountain or *vice versa* in the near future.

A Hitch in Reciprocity.

The series of treaties negotiated at Washington since the meeting of the Pan-American Council form a distinguishing feature in the present Administration. Secretary Blaine was a conspicuous figure in the proceedings of that body, and whatever has since been accomplished in accordance with the objects advocated by it is largely due to his friendly influence. Every announcement of success in the direction indicated has been hailed by a feeling akin to enthusiasm, as promising an extension of our export trade by enlarging the market. Even with Mexico, although unusual difficulties seem to have been encountered, attended with some heat and friction, it is said that pending negotiations promise a satisfactory result. It is only in the case of Canada that the question of improved commercial relations becomes complicated and irritating, if not positively unapproachable.

In former years trade with the region across the St. Lawrence was placed on a reciprocal basis with mutual advantage, although it was claimed by some that the Kanucks had the best of the bargain. Certain it is that comparative freedom of intercourse was conducive to a more neighborly feeling. There was less use for the employment of naval vessels to guard against mutual depredation, and less occasion for a vigilant custom-house service on the frontier.

The effort to "reason together" has been attended with singular misfortune. For the second time the proposed conference of delegates from the Canadian Government with the authorities at Washington has been postponed, and in the last instance indefinitely. On one occasion President Harrison was necessarily absent, and in another Secretary Blaine was indisposed. As understood at Ottawa, the conference was designed "to settle if possible, the lines upon which a joint high commission to be subsequently appointed will arrange a treaty of trade between the two countries." At this later date it is intimated in various quarters that the time for action has gone by—that, indeed, the only kind of reciprocity either party would assent to is the kind that is not wanted.

Canadians are not yet quite prepared to become American citizens for the sake of acquiring new privileges to which they might be entitled. Neither are they prepared for a joint tariff on the seaboard, which in effect would place the foreign traffic of both countries under a single jurisdiction. On the part of the Administration at Washington it is stated semi-officially that "when the outlines of a fair commercial treaty are settled in the minds of the Canadian statesmen—a treaty which, when approved by the Queen's Government, will secure to the manufact-

urers of the United States some advantages not now enjoyed, and which, on the other hand, will give to Canadian products corresponding advantages—the Republic will be glad to negotiate it." So far as relates to manufactures, which was the main point at issue, the recent election in the Dominion was practically adverse to any concession.

To sum up the whole matter as between the United States and Canada, when trade relations are discussed there appear to be irreconcilable differences. At least that seems to be the conclusion of manufacturers and merchants whose interests are most directly concerned. Ample reason for the apparent coyness of the Washington authorities, or disinclination to approach the subject, may be found in the fact that the Dominion Parliament, July 29, after protracted debate, deliberately voted down Sir Richard Cartwright's proposition for "reciprocal freedom of trade between Canada and the United States in manufactured as well as natural products;" yeas 88, nays 114. The adherents of Premier Abbott took the ground that a limited reciprocity arrangement alone would benefit Canada. So the Conservatives claim to be as strong as before Sir John Macdonald's death, and point out that their recent electoral success was a triumph of principles which are now vindicated. This being so, would not a conference be farcical to an extreme? The principle of reciprocity considered in the abstract is universally approved, but in its application to commodities in detail, particularly such as come under the classification "products of industry," no satisfactory adjustment seems possible.

The Duluth Pig-Iron Enterprise.

The manufacture of coke pig iron at Duluth, which will be, without doubt, in actual progress in a few weeks, cannot fail to be regarded with very great interest by an important section of the iron trade. It will be the first attempt to establish a coke pig-iron industry on strictly modern principles directly in the Lake Superior region. Much has been written in favor of a movement of this kind by men of prominence in the iron trade, who have sought to influence capital to embark in the business. The remarkable success of the charcoal furnace at Ashland, Wis., has been pointed to as an example of what might be done also with a well-appointed coke furnace. Their theories, however, were decidedly chilled by the disinclination of the builders of the Duluth furnace to put it in blast after it had been completed. For nearly two years the plant lay idle, without an apparent effort to start it up, and the inference seemed justified that the owners were unable to figure out a possible profit when they were brought face to face with actual conditions; but the furnace has now been leased by men of experience in the manufacture of coke pig iron, and it is to be presumed that they would not have done so without first satisfying themselves of a sufficient profit in the undertaking. Coke will not

for the present be shipped from Eastern coke regions, but will be obtained from the Lehigh Coal and Iron Company, whose coke ovens are at West Superior, very close at hand. It will be manufactured from Connellsville coal, however, and thus the quality will be assured, while it will reach the furnace in better condition and at lower cost than if shipped from coke ovens in Pennsylvania.

Considering the proximity of the furnace to the Minnesota iron ore mines on the one hand and the low lake freights on coal on the other hand, it would not be surprising if the expectations of the lessees of the furnace are realized, and Bessemer pig iron should be made at Duluth about as cheaply as at Pittsburgh. If this proves to be the case on an actual furnace run, an impetus will be given to iron and steel production on the southern shore of Lake Superior that theoretical essays and cost estimates would never have been able to accomplish. The West Superior Steel Works will not only be shown to rest on a more solid foundation than manufacturers in other sections have been willing to concede, but other projects of moment now only in embryo will be quickened.

OBITUARY.

THOMAS GRAHAM.

Thomas Graham of Philadelphia died at San Antonio, Texas, on the 8th inst., of mountain fever, which he contracted in Mexico. He was trying to get home, but was compelled to stop at San Antonio.

Mr. Graham was born in Philadelphia, March 19, 1826, being a son of Peter Graham, a member of the merchant firm of Graham Brothers of Philadelphia, New York, Glasgow and Liverpool. He early turned his attention to the anthracite coal fields, and until his death he remained active in the coal industry. He also made a study of iron-ore deposits in Pennsylvania and in the South. About 17 years ago he organized the New River Railroad Company to bring to market the coal, ores, timber and crops of the New River region, in Virginia, and while working on this project discovered and developed the Flat Top or Pocahontas coal field, which now sends out over the New River Railroad 500 carloads of coal and coke a day. The road is an important part of the Norfolk and Western Railroad system. A town on the edge of the coal field was named Graham in honor of the promoter of the region's development, and is a busy railroad junction. At that place is the furnace of the Graham Furnace Company, another project in which Mr. Graham was interested.

HENRY GARONO.

The death is announced of Henry Garono, a Hardware merchant of Buffalo, N. Y., on the 28th ult. Mr. Garono was born in that city, February 25, 1843, and had always lived there. After leaving school he entered the employ of Sidney Shepard and rose to the position of chief clerk and business manager. He subsequently went into partnership with Mr. Hauck, the firm being Hauck & Garono. About ten years ago the partnership was dissolved and Mr. Garono had since carried on the business alone at 563 Main street. Mr. Garono was a member of a number of civic and religious organizations.

Iron Ore in the United States.

The Census Office has just issued a bulletin in relation to iron ore, prepared by John Birkinbine, special agent, under the supervision of Dr. David T. Day, in charge of the Division of Mines and Mining of the Census Office. The document in question is very elaborate, so that only an extract can be presented. It covers the calendar year 1889, and shows that the production in that year amounted to 14,518,041 long tons, contributed by 26 States and two Territories. This output represented a value on cars or carts at the mines of \$33,351,978, an average of \$2.30 per ton.

The following table shows the number of iron-ore mines reported, the number of mines producing in 1889, the amount of iron ore produced, the average value per long ton, the total valuation of iron ore produced and consumed, the stock on hand at the commencement and end of the census year, and the apparent consumption or shipments of iron ore:

Product and Value of Iron Ore in 1889, by States and Territories.

States and Territories.	Number of mines producing.	Amount produced. Long tons.	Stock on hand January 1, 1889. Long tons.	Stock on hand January 1, 1890. Long tons.	Total value of production.	Value per long ton.	Total shipments. Long tons.	Total value of shipments.
Total	562	14,518,041	1,966,824	2,256,973	\$33,351,978	\$2.30	14,227,892	\$32,766,506
Alabama	45	1,570,319	61,125	104,462	1,511,611	.96	1,526,982	1,457,314
Colorado	18	109,136	1,628	7,193	487,433	4.47	103,571	469,546
Connecticut, Maine and Massachusetts	7	88,251	22,270	18,723	265,901	3.01	91,807	278,888
Delaware and Maryland. Georgia and North Carolina	14	29,380	7,298	14,476	68,240	2.32	22,262	54,460
Idaho and Montana	17	258,145	19,443	32,148	394,025	1.20	245,440	317,372
Kentucky	7	24,072	1,893	4,216	158,974	6.60	21,749	140,647
Michigan	4	77,487	17,390	16,491	135,559	1.75	78,286	133,885
Minnesota	73	5,856,169	803,700	903,469	15,800,521	2.70	5,756,370	15,588,369
Missouri	4	864,508	273,395	278,936	2,478,041	2.87	858,967	2,464,419
New Jersey	8	265,718	251,001	291,730	561,041	2.11	225,019	470,437
New Mexico and Utah	24	415,510	98,240	94,800	1,341,543	3.23	418,860	1,352,509
New York	2	36,050	500	1,000	70,956	1.97	35,550	69,956
Ohio	35	1,247,537	158,223	185,800	3,100,216	2.49	1,219,870	3,028,676
Oregon and Washington	70	254,294	58,300	71,083	532,725	2.09	241,420	515,148
Pennsylvania	3	26,283	3,575	2,740	39,234	1.49	27,118	40,389
Tennessee	189	1,560,234	82,322	91,980	3,063,534	1.96	1,550,567	3,045,100
Texas	16	473,294	29,863	16,844	606,476	1.28	486,313	629,454
Virginia and West Virginia	2	13,000	200	4,300	19,750	1.52	8,900	16,554
Wisconsin	38	511,255	53,184	69,634	935,290	1.83	494,805	894,951
	16	897,399	23,357	46,669	1,840,908	2.20	814,087	1,798,403

The above statement is tabulated from actual returns, verified in every way possible except by individual visitations to all of the iron-ore mines. The figures of production are possibly below the actual results, for in some localities farmers gather ore at odd times and sell to blast furnaces in small lots. Wherever this amount could be obtained it is included in the table. No returns have yet been secured from a few mines; hence their outputs were omitted where they could not be closely estimated. Some persons who mine ore on a small scale keep such insufficient records that allowances have to be made from the figures given. In other mines the practice of recording the output by the number of cars or skips handled has a tendency to underestimate the actual product.

Making fair allowance for all of the above, and possibly also for some scattered iron-ore mining of which the Census Office had no knowledge, the total amount of iron ore produced in the United States in the year 1889 probably exceeded 14,650,000 long tons. In the discussion of distribution, value, cost, &c., however, the actual figures as determined—viz., 14,518,041 long tons—will be used.

With the exception of a few mines in Wisconsin, the value of iron ore at the mines and the costs of mining in the States of Michigan, Minnesota and Wisconsin may be taken as representing the operations of mines in the Lake Superior region, which are worked principally underground, producing ores rich enough in iron to withstand heavy transport charges to distant points. On the other hand, the figures for Alabama, Tennessee, and Virginia and West Virginia represent the winning of leaner iron ore, which is chiefly consumed close to the mines. While much of this ore is obtained from underground workings, a considerable portion is won from open cut operations. The value given for ores obtained from mines which may properly be considered in the Lake Superior region averaged \$2.66 per ton and the value of ores from the States of Alabama, Tennessee and Virginia and West Virginia averaged \$1.20 per ton.

In 1889 there were 65 mining operations each of which reported a product exceeding 50,000 long tons. Of these 46 furnished red hematite, 9 magnetite, 8

brown hematite and 2 carbonate ores. These 65 mines aggregated a production of 10,391,490 long tons, representing 71.58 per cent. of the total output of the country. The ore was valued at \$24,340,611, or 72.98 per cent. of the total valuation.

Of the 65 mines mentioned, 31 produced between 50,000 and 100,000 tons, 17 between 100,000 and 200,000 tons, 11 between 200,000 and 300,000 tons, 2 between 300,000 and 400,000 tons, 2 between 500,000 and 600,000 tons, 1 produced 769,000 tons and 1 produced 809,000 tons. Of these mines Michigan held the largest number, 29; 11 producing between 50,000 and 100,000 tons, 9 between 100,000 and 200,000 tons, 6 between 200,000 and 300,000 tons, 1 over 300,000 tons, 1 over 500,000 tons and 1 over 800,000 tons.

A very interesting inquiry has been conducted by Mr. Birkinbine in regard to the character of the ores mined. He classified them in four general divisions: Brown hematite, including limonite or bog ore; red hematite, including specular or fossil ore, magnetic ore; carbonate, including siderite, spathic or blackband ores. During the census year 9,056,288 long tons, or 62.38 per cent. of the iron ores produced in the United States in the census

was of the red hematite variety; 2,523,087 long tons, or 17.38 per cent., was brown hematite; 2,506,415 long tons, or 17.26 per cent. was magnetite, and 432,251 long tons, or 2.98 per cent., was carbonate.

The largest producer of red hematite was Michigan, which is credited with 5,272,915 long tons, or 58.22 per cent. of the total. In this class of ore Alabama comes next, with 1,190,985 long tons, or 13.15 per cent. Minnesota follows with 864,508 long tons, or 9.55 per cent.; Wisconsin with 735,429 long tons, or 8.12 per cent., and Tennessee with 299,102 long tons, or 3.30 per cent. These five States contributed 8,362,939 long tons, or 92.34 per cent. of the total output of red hematite mined in the census year.

Nearly equal proportions of brown hematite and magnetite were produced, the former representing 2,523,087 long tons, or 17.38 per cent., and the latter 2,506,415 long tons, or 17.26 per cent., of the total iron ore output.

Pennsylvania contributed 496,555 long tons of brown hematite, or 19.68 per cent.; Virginia and West Virginia together, 487,208 long tons, or 19.31 per cent.; Alabama, 379,334 long tons, or 15.03 per cent., and Michigan 332,257 long tons, or 13.17 per cent., of the brown hematite mined in 1889. These five States, therefore are credited with 1,695,354 long tons, or 67.19 per cent. of the total output of brown hematite ore.

New York is the largest producer of magnetite, and is credited with 927,269 long tons, or 37 per cent. of the total of that class of ore mined, Pennsylvania coming next, with 860,916 long tons, or 34.35 per cent., followed by New Jersey, with 415,510 long tons, or 16.58 per cent., and Michigan, with 250,997 long tons, or 10.01 per cent. These four States produced 2,454,692 long tons, or 97.94 per cent. of all the magnetic iron ore mined in 1889.

The carbonate ores amounted to but 432,251 long tons, or 2.98 per cent. of the total output, of which Ohio contributed 254,294 long tons, or 58.83 per cent.; New York, 65,456 long tons, or 15.14 per cent.; Kentucky, 52,275 long tons, or 12.09 per cent., and Pennsylvania, 39,806 long tons, or 9.21 per cent. These four States produced 411,831 long tons, or 95.28 per cent. of the total of this kind of ore mined.

Consumption.

Adding to the stock of iron ore on hand January 1, 1889, 1,966,824 long tons, the production for the year, 14,518,041 tons, and deducting the stock on hand January 1, 1890, 2,256,973 long tons, there is an apparent total consumption of 14,227,892 tons, valued at \$32,766,506. To this apparent consumption, however, should be added: (1) The materials which are charged into blast furnaces as ore, but which are products coming from the puddling and heating furnaces and the rolls and hammers of rolling mills; (2) the materials from the retorts in which the franklinite of New Jersey is treated for the removal of zinc, leaving as a residuum a mixture of iron and manganese oxides, employed in blast furnaces for producing spiegeleisen, and (3) the blue billy or purple ore, the residuum of pyrites burned to produce sulphuric acid, and some of the silicates of iron, which, as cinder, result from the treatment of copper ores, may also be utilized and smelted as iron ores.

The approximate amounts of these materials which were fed to blast furnaces in 1889 are as follows (the figures being partly from estimates and partly from data specially collected for the purpose):

Apparent Consumption of Iron Ore.

	Long tons.
Domestic iron ore.....	14,227,892
Rolling mill cinder, roll and hammer scale, residuum from treating zinc ores, blue billy and slags.....	652,000

Imported iron ore, mostly for producing pig iron..... 853,573

Total consumption of iron ore or other material used as iron ore in the United States..... 15,733,465

This consumption cannot be distributed with any great degree of accuracy, for the reason that the inquiries did not include following the ore to the individual consumers; but approximate figures obtained from other sources permit of giving a general idea as to the extent to which iron ore is used for special purposes.

The rolling mills of the country consumed in the year 1889 for "fix" or "fettling" about 385,000 long tons of iron ore, mostly from domestic mines. The silver smelters used for flux, as reported by operators of mines to this office, 157,908 long tons of iron ore. This does not include any ores which were high enough in silver to encourage their use independent of their iron contents. In the open-hearth steel furnaces, and in making blooms direct from the ore in forges or other direct processes, the consumption approximated 39,500 long tons. This leaves for the consumption of blast furnaces of the United States, say, 15,151,057 long tons of iron ore, mill cinder, &c.

Making allowances for mill cinder, roll and hammer scale, &c., used, there is a total consumption of iron ore of, say, 14,499,057 long tons in the blast furnaces of the United States, or, if the foreign ores (of which 7500 tons are estimated as used in rolling mills, forges, &c.) are omitted from the calculation, the consumption in American blast furnaces of iron ore produced from domestic mines was 13,652,984 long tons.

Allowing for discrepancies in the figures presented, as mentioned under the head of "Production," there were supplied to American blast furnaces in the year 1889 fully 13,780,000 long tons of domestic ore.

In order to check up the totals of the different kinds of iron ore reported and obtain approximately the yield of iron ores in the blast furnaces, letters were sent to the blast-furnace managers in the United States, inclosing schedules which they were requested to fill out. On these schedules the amounts of the different characters of ore—viz., red hematite, brown hematite, magnetite, carbonate—and the general localities from which the ores were obtained, as well as the amount of foreign ores, mill cinder, &c., used and the amounts of pig iron produced in 1889, were given. Complete returns were obtained from most of the States, and in those which failed to supply all the desired information it was possible to estimate closely from other data accessible the amounts of iron ore used and pig iron made.

From these returns and supplementary information the following statement concerning the pig iron producing value of the iron ores used in the different States was prepared, and wherever possible the yield of ores obtained from the various States was determined.

The returns received from Alabama blast furnaces represent over 90 per cent. of its output, and show that a great majority of the ores used was obtained from local mines, although some ore was brought in from Georgia. The average yield in the blast furnaces of the iron ores used was 46 per cent. Over 70 per cent. of these ores was red hematite, the balance being brown hematite, with the exception of 2100 long tons of mill cinder, &c. The blast furnace reports show that the ores used ranged from 30.5 to 51.6 per cent. of iron.

Illinois produced no iron ores and obtained the entire supply of its furnaces from the Lake Superior region. The returns for the entire pig iron production should, therefore, be credited to that dis-

trict, and these showed a yield of 60 per cent., which is practically a fair indication of the iron ore shipped to points of consumption from the Lake Superior region. Ninety-four per cent. of the ore charged to the Illinois furnaces was red hematite, 2.5 per cent. magnetite, and 3.5 per cent. mill cinder, &c.

The location of the majority of the Michigan blast furnaces within convenient distance of the ore supply gave these plants, which use charcoal as fuel, some of the ores of lower grade than could stand transportation to distant points, and hence the yield of ore in these furnaces is lower than would be supposed—viz., 58 per cent. of iron—and lower than the yield of Lake Superior ores in furnaces at greater distances. The red hematites formed the bulk of the supply, but some magnetites and brown hematites were also used.

The Missouri blast furnaces used local ores, chiefly red hematite, with a small admixture of brown hematite, and yielding 56.4 per cent. of iron.

The blast furnaces in New Jersey, while depending chiefly upon the local magnetites of that State, also receive a portion of their supply from the Lake Superior region, from New York, a small amount from Pennsylvania, and some foreign ores, the yield for the State being 51.9 per cent.

About one-half of the ores used in New York are local magnetites; over 30 per cent. were red hematite from that State and the Lake Superior region, the balance being made up of brown hematite from New York and the New England States, carbonates from New York and mill cinder, &c., the average yield being 47.6 per cent. of iron.

Ohio obtains the bulk of its ores from the Lake Superior region and from its local carbonates, although some magnetite from New York, carbonate ores from Kentucky and red hematite from Missouri are used. These ores yielded on an average 56.7 per cent. of iron.

Oregon supplies the brown hematite ore which is used in its blast furnaces, which yielded about 32 per cent. of iron.

Pennsylvania is the largest consumer of foreign ores, fully 85 per cent. of the reported total of this class of ore being shipped into that State, and several furnaces draw their entire supply from this source, with an occasional admixture of local cinder. It is also the heaviest consumer for the Lake Superior ores, obtaining most of its red hematite from that region, which are supplemented by some of the local ores. In addition to its liberal supply of magnetite from the Cornwall ore hills, Dillsburg, &c., it obtains this class of ore from New York, New Jersey and Lake Superior region. The brown hematites are mostly obtained from local mines, although some were sent from Virginia. Some local carbonates and some from Ohio are also used. Instances of dependence upon one class of ore show a yield from hematites obtained from Spain and Africa of 63.6 and 60.2 per cent.; of all Lake Superior ores, 61.5, 61.8, 62.6, 60.8, 60 and 59.5 per cent.; of all Pennsylvania magnetites, 51, 50.9, 49.1, 48.9 and 48.5 per cent.; of Pennsylvania brown hematite, 41.5, 45.6 and 41.2 per cent.; of local fossil ores, 37.9 and 36.9 per cent., and of ore from Cuba and Mediterranean ports 56.6 per cent. The average for the State is 55.3 per cent.

The brown and red hematites which form the chief base of supply for the Tennessee furnaces come from local mines, with additions from Alabama and Georgia. Some carbonate ore and mill cinder are also used, the yield for the State being 39.6. Furnaces using only brown hematites showed an average iron contents of 38.8 per cent.

Virginia depends principally upon her brown hematite mines, which supplied

over 85 per cent. of the ore used in that State, the balance coming from local red hematite mines, magnetites mined in North Carolina, and a small amount of mill cinder. These gave an average yield of 43.4 per cent. of iron. Several furnaces depended entirely upon the use of brown hematites, which showed percentages of 48.6, 43.3 and 41.4 of iron respectively.

West Virginia obtains most of the ore for its furnaces from the Lake Superior district, and, with the exception of some mill cinder, local brown hematite and carbonate ores, and a small amount of magnetite, is entirely dependent upon that section of the country. This raises its percentage close to 60 of iron.

Wisconsin's blast furnaces also draw their supply from the Lake Superior district, and with the exception of some mill cinder the red and brown hematites were the only ores used, and gave an average yield of 57.2 per cent. of iron.

Labor and Wages.

The returns recorded show that the mining of iron ore gave employment directly to 38,227 persons, an increase of 6559 men, or 20.71 per cent. over the tenth census, when the number was 31,668 engaged in work connected with breaking down and raising the ore and delivering it in cars or carts or on stock piles at the mines. This force was divided as follows: 1366 foremen (680 employed above and 686 below ground), 2070 mechanics, 12,432 miners, 21,010 laborers (14,531 above and 6479 below ground), 820 boys (709 being employed above and 111 below ground), and 520 men in offices. Omitting the latter, the total number actually employed in handling the ore was 37,707, and the amount paid in wages direct to miners and contractors reached a total of \$15,458,118. This would show an average earning capacity for each man employed of \$409.95 per annum, and includes the contractors' profits and the additional pay allowed to foremen. This is an increase over the figures for 1880 of \$101.01, or 32.70 per cent., which is due principally to the fact that a larger number of the mines are now under ground, permitting the men to be constantly employed throughout the year and demanding better skill.

The compensation paid 520 persons employed in the offices at the mines amounted in the aggregate to \$529,043, an average annual earning of \$1017.39. The office force above mentioned does not include officers or employees in general offices at commercial centers, where accounts are kept or sales and collections made; nor does it include the ore samplers or inspectors employed at shipping or distributing centers.

The following statement shows the expenditure per ton of iron ore won for labor above and below ground in 1889 in the various States and territories, not including the compensation paid office attendants, but including contractors' profits:

Average Expenditures For Wages Per Long Ton of Iron Ore.

The United States.....	\$1.06
Alabama.....	.09
Colorado.....	2.48
Connecticut, Maine and Massachusetts.....	1.82
Delaware and Maryland.....	1.65
Georgia and North Carolina.....	.71
Idaho and Montana.....	2.21
Kentucky.....	.87
Michigan.....	1.19
Minnesota.....	1.10
Missouri.....	.97
New Jersey.....	1.71
New Mexico and Utah.....	1.22
New York.....	1.00
Ohio.....	1.40
Oregon and Washington.....	1.20
Pennsylvania.....	.75
Tennessee.....	.76
Texas.....	.91
Virginia and West Virginia.....	1.09
Wisconsin.....	1.00

Michigan as the largest producer naturally gives employment to the greatest number of persons—namely, 13,120, or

34.32 per cent. of all the employees at the mines of the United States; Pennsylvania follows with 4410 employees, or 11.54 per cent.; New York ranks third, its iron-ore mining industry giving employment to 3178 persons, or 8.31 per cent. of the total number of employees, and Alabama occupies fourth place, which State reported a total of 3122 employees, or 8.17 per cent. These four States had 23,830 persons, or 62.34 per cent. of the total, employed in their iron-ore mines.

Omitting the office force, the same relative positions are held by the States named, and the number of persons employed above and below ground—that is, in actual mining—divided into the tons of iron ore produced in some of the important States, is as follows:

Tons of Iron Ore Produced Per Employee.

States.	Amount produced. Long tons.	Number of employees above and below ground.	Tons of ore per employee.
The United States.....	14,518,041	37,707	385.02
Michigan.....	5,856,169	12,947	452.32
Alabama.....	1,570,319	3,081	509.68
Pennsylvania.....	1,560,334	4,370	357.03
New York.....	1,247,587	3,132	398.32
Minnesota.....	864,508	1,755	492.60
Wisconsin.....	857,499	1,817	460.87
Virginia and W. Virginia.....	511,255	2,436	209.87
Tennessee.....	473,294	1,515	312.41
New Jersey.....	415,510	1,872	221.96
Missouri.....	265,718	706	376.37
Ohio.....	254,294	1,610	157.95
Georgia and N. Carolina.....	258,145	780	330.96
Colorado.....	169,136	391	279.12

Total Cost of Mining Iron Ore.

The total cost of the ore mined, as represented by schedules returned, aggregates \$24,781,658, equivalent to an average cost of \$1.71 per ton of ore mined, against \$2.21 in 1880, a decrease of 50 cents per ton, or 22.62 per cent. The cost similarly determined for each State is set forth in the statement below, which can be compared with the table in previous column, showing the expenditure for labor per ton of iron ore produced, and also with the above table, indicating the quantity of ore won per employee. The difference includes more than supplies and materials. These figures indicate the advance made in labor-saving appliances and improved facilities for mining and handling the product of the mines.

In the total cost of producing iron ore Alabama is the only State which averages less than \$1 per ton—viz., 82 cents. Next in order of low cost come Texas, \$1.05; Tennessee, \$1.08; Pennsylvania, \$1.10; Georgia and North Carolina, \$1.14. In Colorado, for reasons before given, the cost of producing one long ton of ore, \$3.49, is greater than in any other State.

Total Cost of Producing One Long Ton of Iron Ore in the Various States and Territories.

The United States.....	\$1.71
Alabama.....	0.82
Colorado.....	3.49
Connecticut, Maine and Massachusetts.....	2.73
Delaware and Maryland.....	2.02
Georgia and North Carolina.....	1.14
Idaho and Montana.....	2.90
Kentucky.....	1.30
Michigan.....	2.07
Minnesota.....	1.80
Missouri.....	1.49
New Jersey.....	2.74
New Mexico and Utah.....	1.50
New York.....	1.64
Ohio.....	1.67
Oregon and Washington.....	1.40
Pennsylvania.....	1.10
Tennessee.....	1.08
Texas.....	1.05
Virginia and West Virginia.....	1.64
Wisconsin.....	1.78

The figures give the total value of the iron-ore product at the mines in the year 1889 as \$33,351,978, and the table of expenditures shows that the total cost of mining during the same year was \$24,781,658, indicating an apparent profit of \$8,570,320, or 34.58 per cent. of the total expenditure during the year for labor, supplies and materials, superintendence, incidentals, taxes, &c., and also in some cases royalties; but in addition to these expenses there is interest on capital invested, cost of betterments, renewals, replacements and additions to machinery, fixtures, live stock, general management and offices, sinking fund, &c., to be accounted for.

The apparent profit of \$8,570,320 represents 7.81 per cent. of the total capital invested, viz., \$109,766,190, but from the above allowances for depreciation, &c., must be made, and if, as before mentioned, the total capital reported is below that actually employed, the average investment will appear less satisfactory than the figures above given suggest.

New Tin-Plate Works at Pittsburgh.

All indications point to the fact that Pittsburgh is destined to take a leading position in the manufacture of tin andterne plates. In addition to the plant of the United States Iron and Tin-Plate Mfg. Company, Demmler, Pa., manufacturers of bright plates, and that of P. H. Laufman & Co., Limited, at Apollo, Pa., manufacturers of roofing plates, which have both been in operation for some time and turning out a large product, we have information that another tin-plate plant will be in operation at Kensington, 18 miles from Pittsburgh, on the line of the Allegheny Valley Railroad, at a very early date. The parties connected with the new enterprise are Strawbridge and Beaver, who have formed a limited partnership under the firm name of Strawbridge & Beaver, Limited. They propose to locate a tin-plate plant at Kensington, and with this object in view have already awarded a contract for the erection of a cold rolling mill, 18 x 24 feet in size, to the Leechburg Foundry and Machine Company of Pittsburgh, whose plant is located at Leechburg, Pa. In a few days they will also let a contract for the erection of two 20-inch hot mills, tinning pots, pickling machines and all necessary machinery to operate the plant. For the purpose of getting their product on the market as soon as possible they let the contract for the cold-rolling mill at this time, and work on it has already been commenced by the Leechburg Foundry and Machine Company. The same company are also getting up designs and estimates for the other machinery as rapidly as possible. For the present the new firm will make only bright plates, and will purchase the black sheets in the open market. It is their intention, however, further along to put in the necessary machinery to roll down the tin-plate bar and bring it out a finished plate. The contract for the erection of the cold-rolling mill calls for its completion in 60 days, and the new firm expect to be in operation and turning out tin plates not later than January 1 of next year. Their output at the start will be from 120 to 150 boxes per day. They also propose as soon as convenient to apply for a charter of incorporation for a concern to be known as the Pittsburgh Tin Plate Company to succeed the present firm of Strawbridge & Beaver, Limited. In this connection we can state that the above concern is the first to locate in Pittsburgh for the manufacture of tin plates exclusively. The Apollo and Demmler concerns already had the necessary sheet mills, and it was only necessary for them to put in some other machinery and the tinning pots in order to

produce tin and terne plates. In this connection it is pertinent to say that we have reliable information that a company is in process of organization which proposes to enter very largely into the manufacture of tin and terne plates. The new concern will be located not many miles from Pittsburgh and will erect a complete plant in every respect, including sheet rolls, cold rolls and all necessary machinery to make tin and terne plates from Bessemer steel billets.

Henry Sellers McKee, R. C. McLean, J. D. McCable, Jas. Ormsby and Wm. R. Hartupce, all of Pittsburgh, have made application to the Governor of Pennsylvania for charters for four corporations, the purposes of which are to supply heat and light to the boroughs of Homestead, McKees Rocks, Chartiers, Esplen and Mansfield. These corporations will be named after the borough to which they propose giving service. The incorporators of these new companies now comprise the Low Pressure Gas Company, which for five years have supplied the places named with natural gas fuel. When the new concerns are organized and commence business, the single corporation will retire. Natural gas is now supplied by the Low Pressure Company for domestic purposes in the towns named. The new corporations propose to supply a specially prepared artificial gas for both light and fuel, which will take the place of the natural fuel. This matter was made necessary by the fact that the supply of natural gas in their lines is nearly exhausted.

The Oliver & Roberts Wire Company.

In Pittsburgh last week announcement was made that the Oliver & Roberts Wire Company, Limited, of that city have been compelled to suspend payment on account of a lack of ready capital to meet bills and notes which fall due during the present and succeeding month. The firm have a large amount of paper outstanding, most of which is indorsed by a gentleman who is at the head of one of the largest firms in Pittsburgh, and who was recently compelled to ask an extension from his creditors in which to meet his own obligations. The banks that hold this paper were therefore unwilling to renew it without additional security. For this and other reasons the firm decided to suspend payments, which was done on Friday, the 9th inst. Geo. T. Oliver, vice-president of the firm, has made the following statement in regard to their condition:

"It is true that the Oliver & Roberts Wire Company have been compelled to suspend payments. This suspension is caused primarily by the embarrassment of a certain firm in this city. The head of the firm is an indorser on our paper for a considerable amount. This paper is held by various Pittsburgh banks, and most of it matures during this and next month. Under the circumstances the holders do not feel justified in renewing it without additional security, which we are unable to give. The only course open for us is, therefore, to call our creditors together, lay before them a statement of our affairs, and ask them for time. Our assets largely exceed our liabilities, and we expect to and will pay every dollar we owe, with 6 per cent. interest.

"The Oliver Iron & Steel Company, of which Henry W. Oliver, Jr., is president, is not involved in our embarrassment. I cannot tell what our obligations are, for I do not know. It is as yet impossible to make an estimate of our indebtedness. However, our assets will exceed our liabilities."

It is the impression that the firm will not be compelled to make an assignment, but will be granted the extension which

they have requested. The Oliver & Roberts Wire Company, Limited, are large manufacturers of wire rods and wire nails. The officers of the firm are as follows: H. W. Oliver, president; Geo. T. Oliver, vice president; W. H. Cassidy, secretary and treasurer, and H. Roberts, general superintendent. As soon as the statement of the affairs of the firm can be prepared a meeting of the creditors will be called, at which the exact condition of the firm will be made known. The suspension of this firm did not create a great deal of surprise in business circles in Pittsburgh, as it has been known for some time that they were hard pressed for ready cash and had a great deal of paper outstanding in the different banks. It can be stated in this connection that their suspension was precipitated by the financial difficulties of a large concern in Pittsburgh referred to above, which asked an extension from its creditors some months since, mention of which was made in these columns at the time.

The Old Dominion Steamship Company are making a record for carrying Southern pig iron, handling since Saturday morning 1700 tons.

An Increase in the Make of Pig Iron.

Production of pig iron has increased along the whole line during the month of September, and has now reached the former maxima. That this enormous product is readily absorbed in spite of a disappointing demand from the railroads may well be accepted as marvelous.

The weekly product of all the furnaces on October 1 compared as follows with that of preceding periods:

	Furnaces in blast.	Capacity per week. Gross tons.
October 1.....	306	181,615
September 1.....	299	170,846
August 1.....	296	169,576
July 1.....	293	171,115
June 1.....	288	146,782
May 1.....	287	115,590
April 1.....	228	113,483
March 1.....	257	134,536
February 1.....	294	146,050
January 1, 1891.....	302	167,509
December 1, 1890.....	340	183,846
November 1.....	342	177,958
October 1.....	336	179,263
September 1.....	323	171,776
August 1.....	324	164,798
July 1.....	336	176,727
June 1.....	345	180,791
May 1.....	344	180,099
April 1.....	344	178,474
March 1.....	343	180,991
February 1.....	334	173,651
January 1.....	333	174,038
December 1, 1890.....	328	169,151
November 1.....	323	165,225
October 1.....	311	151,057
September 1.....	294	134,068
August 1.....	286	145,899
July 1.....	285	141,419

The status of the anthracite furnaces is exhibited in the following table:

Anthracite Furnaces, October 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York.....	19	7	2,314	12	3,778
New Jersey.....	12	3	1,128	9	2,913
Spiegel.....	3	3	212	0	0
Pennsylvania:					
Lehigh Valley.....	47	28	10,206	19	8,090
Spiegel.....	1	1	55	0	0
Schuylkill Valley.....	30	17	7,543	13	3,782
U. S. Susquehanna Valley.....	18	8	2,762	10	1,970
L. S. Susquehanna Valley.....	17	11	4,490	6	2,870
Lebanon Valley.....	16	7	3,749	9	2,914
Totals.....	163	85	32,459	78	29,317

For a number of months past our records show the following:

	Furnaces in blast.	Capacity per week.
October 1.....	85	32,459
September 1.....	82	31,214
August 1.....	88	32,860
July 1.....	92	37,802
June 1.....	91	36,561
May 1.....	90	35,331
April 1.....	91	36,598
March 1.....	93	38,543
February 1.....	95	40,212
January 1.....	101	43,166
December 1, 1890.....	105	43,474
November 1.....	104	42,141
October 1.....	100	38,627
September 1.....	106	39,115
August 1.....	106	41,013
July 1.....	112	42,543
June 1.....	117	45,142
May 1.....	123	46,912
April 1.....	119	46,110
March 1.....	115	45,790

Among the anthracite furnaces which have blown out during September we may note one of the Bethlehem Iron Company, one of the Hokendauqua plant of the Thomas Iron Company, and the second Bird Coleman in the Lebanon valley. There were blown in during the same month Swede Furnace in the Schuylkill Valley, Marshall in the Upper Susquehanna, to be followed at an early date by Duncannon in the same district, and a third furnace of the Pennsylvania Steel Company.

The position of the coke furnaces was as follows:

Coke Furnaces, October 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York.....	6	3	3,578	3	2,095
Pennsylvania:					
Pittsburgh district.....	25	21	31,643	4	4,552
Spiegel.....	1	1	524	0	0
Shenango Valley.....	18	13	10,054	5	2,483
Juniata and Conemaugh Valley.....	19	9	5,270	10	3,359
Spiegel.....	1	0	0	1	400
Youghiogheny Val.....	5	1	750	4	1,890
Miscellaneous.....	4	2	1,630	2	1,140
Maryland.....	4	3	3,370	1	1,540
West Virginia.....	4	3	2,608	1	470
Ohio:					
Mahoning Valley.....	15	11	9,946	4	1,850
Central and Northern.....	16	12	10,341	4	3,070
Hocking Valley.....	14	4	1,176	10	2,527
Hanging Rock.....	15	10	2,030	5	1,332
Indiana.....	2	2	381	0	0
Illinois.....	18	15	19,845	3	2,400
Spiegel.....	1	1	713	0	0
Wisconsin.....	4	3	2,658	1	572
Missouri.....	6	1	618	5	2,760
Colorado.....	2	1	470	1	450
The South:					
Virginia.....	14	11	6,274	3	1,300
Kentucky.....	4	2	583	2	700
Alabama.....	37	22	15,221	15	8,580
Tennessee.....	12	10	5,368	2	850
Georgia.....	2	1	741	1	303
North Carolina.....	1	1	125	0	0
Totals.....	250	163	135,997	87	44,283

As compared with previous months, the active coke furnaces make the following showing:

	Furnaces in blast.	Capacity per week.
October 1.....	163	135,997
September 1.....	161	127,664
August 1.....	154	125,736
July 1.....	150	122,422
June 1.....	124	100,165
May 1.....	98	70,529
April 1.....	96	67,570
March 1.....	113	85,093
February 1.....	125	94,473
January 1, 1891.....	143	112,153
December 1.....	168	127,634
November 1.....	163	122,555
October 1.....	170	127,247
September 1.....	156	119,757
August 1.....	150	113,040
July 1.....	163	120,673
June 1.....	167	123,340
May 1.....	109	122,489
April 1.....	173	121,560
March 1.....	169	122,595
February 1.....	169	118,568
January 1, 1890.....	169	119,396
December 1.....	162	116,319
November 1.....	160	112,369
October 1.....	154	102,454
September 1.....	141	90,744

In the Pittsburgh district Soho was banked on the 22d. No. 2 Isabella and Edith are undergoing repairs, and A

Edgar Thomson, the ferromanganese furnace of that plant, will be remodeled. In the Shenango Valley Claire and one Stewart have blown out, and on the Youghiogheny one only, Dunbar, is now blowing. In Ohio, Emma started in the 14th ult., while the Mahoning and Hocking valleys and the Hanging Rock region show no change. The greatest increase has taken place in Illinois, where a second Joliet and the new Iroquois have been started. The product of the State in September was 82,193 gross tons. Brazil, in Indiana, has blown out on the 5th inst., while Vigo went into blast in September.

The South has materially increased its product, although Norton, in Kentucky, stopped on the 1st inst. Princess, in Virginia, began work on the same date, while in Alabama the second Pioneer and Trussville blew in during September. The total product of the State in that month, every plant reporting, was 63,447 gross tons.

The position of the charcoal furnaces was as follows:

Charcoal Furnaces, October 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New England.....	14	4	340	10	600
New York.....	8	12	245	6	525
Pennsylvania.....	15	4	325	11	650
Maryland.....	6	12	228	4	385
Virginia.....	18	1	40	17	910
Ohio.....	10	8	630	125	
Kentucky.....	3	1	163	12	800
Tennessee.....	8	4	1,149	4	410
Georgia.....	4	3	868	1	75
Alabama.....	13	7	1,737	6	780
Michigan.....	12	12	4,012	15	4,090
Missouri.....	1	1	328	1	293
Wisconsin.....	5	4	1,996	1	300
Texas.....	4	4	930	0	0
California.....	1	0	0	1	120
Washington.....	1	0	0	1	170
Oregon.....	1	1	236	0	0
Totals.....	140	58	13,159	82	10,323

As compared with previous months the record stands as follows:

	Furnaces in blast.	Capacity per week.
October 1.....	58	13,159
September 1.....	56	11,968
August 1.....	54	10,980
July 1.....	50	10,801
June 1.....	44	10,066
May 1.....	39	9,730
April 1.....	41	9,295
March 1.....	51	10,890
February 1.....	56	11,365
January 1, 1891.....	59	12,290
December 1.....	67	12,738
November 1.....	70	13,282
October 1.....	66	13,389
September 1.....	63	12,904
August 1.....	59	10,745
July 1.....	61	12,511
June 1.....	61	12,312
May 1.....	52	10,698
April 1.....	52	10,804
March 1.....	59	12,606
February 1.....	58	11,378
January 1, 1890.....	59	11,485
December 1.....	66	12,779
November 1.....	67	12,893
October 1.....	63	12,047
September 1.....	60	11,327

The following changes may be noted: Richmond, in Massachusetts, has blown out one furnace, and Kent, in Connecticut, has temporarily stopped operations. To offset this, Landon started on September 10. In the Northwestern producing district there have been no changes, and a similar report may be made for the South.

The amount of stock carried by the coke furnaces on October 1 was practically the same as on September 1, 128 stacks, with a weekly capacity of 101,314 tons, reporting 198,597 tons on hand, as compared with 123 furnaces and 193,828 tons of stock on September 1. A slight decrease is noticeable among the charcoal furnaces, where 145,179 tons is reported in the yards of 46 furnaces, capable of producing at the rate of 11,286 tons a

week, as against 152,774 tons and 48 furnaces on September 1. A noticeable decrease has also taken place among the anthracite producers, where the stock has fallen from 149,227 tons reported by 52 furnaces last month to 144,703 tons carried by 53 stacks on October 1.

The charcoal furnaces in Michigan have only unloaded about 800 tons of the 75,970 tons of iron reported in 12 yards on September 1, while the four producers in Wisconsin have added 500 tons to the 25,075 tons reported last month. In the South no perceptible change has taken place, about 38,000 tons being stacked in that section. In the anthracite region, New York and New Jersey continue to lead, with 41,790 and 40,000 tons, respectively, which indicates a decrease from last month of about 3500 tons each. Ten active and one idle coke furnaces in Shenango Valley, Pa., report 25,607 tons on hand October 1, as compared with 21,367 tons last month reported by the same number of furnaces. In upper Susquehanna Valley only about 2000 tons are available for market in the yards of the seven furnaces in blast. Virginia coke furnaces carry 32,842 tons, held by nine active and one idle stacks, while 39,301 tons are stacked in the Lehigh Valley, Pa. Mahoning Valley, Ohio, contributes 26,565 tons of stock to the available supply, which is an increase of about 10,000 tons over the figure for last month, the amount in both cases being held by nine producing furnaces.

MANUFACTURING.

Iron and Steel.

The Enterprise Iron Works of Cartwright, McCurdy & Co. at Youngstown, Ohio, have recently been enlarged and improved in various ways until now they have one of the most complete rolling mill plants in the country. Their new puddle mill, containing all the latest improvements, is working in a manner highly satisfactory to the firm.

Furnace A of Carnegie Bros. & Co., Limited, at Bessemer, Pa., will probably be blown out during the present month for the purpose of rebuilding. This furnace was run principally on spiegel. It is the oldest furnace in the blast furnace plant of this firm, having been built under the supervision of Capt. W. R. Jones in 1879, and was put in blast in January, 1880.

The plant of the Hainsworth Steel Company, at Pittsburgh, Pa., which has been idle on account of the disagreement between the firm and employees regarding the scale of wages to be paid, has again been put in operation. The trouble was adjusted in a manner satisfactory to both sides. The scale of wages decided upon represents a reduction of about 15 per cent. from the wages previously ruling. A sliding scale similar in character to the one in effect at Homestead Steel Works of Carnegie, Phipps & Co., Limited, at Homestead, Pa., was adopted, with the selling price of billets at \$25 per ton as the base.

The United States Iron and Tin Plate Mfg. Company of Demmer, Pa., are sending to the trade samples of their tin plate accompanied by the following report of the Pittsburgh Testing Laboratory: "The plate consists of soft steel coated with pure tin, free from lead or zinc. The analysis of a section of the plate gives results as follows: Tin, 5.21 per cent.; manganese, 0.38 per cent. The manganese is a constituent part of the steel plate."

The Morgan Engineering Company of Alliance, Ohio, have recently made a large shipment of tin-plate machinery to the Britton Rolling Mill Company at Cleveland, Ohio, to be placed in the new tin-plate plant which that firm are erecting and which will soon be ready for operation.

The Youngstown Iron and Steel Company of Youngstown, Ohio, operate three separate and distinct plants, as follows: The Trumbull Iron Company, Girard, Ohio; the Youngstown Rolling Mill Company, Youngstown, Ohio, and the Warren Iron and Steel Company, Warren, Ohio. These three plants are being operated to their full capacity, and producing a large output.

The Lancaster (Ohio) Iron Works have been sold by the receiver for \$28,350 to parties supposed to be acting in the interest of the stockholders.

During the month of September the first turn in the converting mills of the Edgar Thomson Steel Works, Limited, Braddock, Pa., made 18,520 tons of steel and the second turn 18,800. In the rail mill the first turn made 14,070 tons and the second turn 13,585 tons of steel rails.

The sale of the partnership interests of the late J. H. Shoenberger in the firms of Shoenberger & Co., proprietors of the Juniata Iron and Steel Works, and Shoenberger, Speer & Co., blast furnace operators, both of Pittsburgh, which was to have been held last week, was again adjourned owing to the fact that no bidders were present. This sale was originally dated to take place on September 3, but was postponed until October 6. These interests are valued at \$208,079.82 and are to be sold as a whole. It is probable that the interests will again be offered for sale at an early date.

The Ohio Car-Wheel Foundry Company have been incorporated, with a capital stock of \$50,000, at Toledo, Ohio.

In the important and growing field of iron making Buffalo is forging ahead. Before the Niagara Furnace at Ironton, near Tonawanda, owned by the Tonawanda Iron and Steel Company (Rogers, Brown & Co.) was remodeled its maximum producing capacity was 90 tons per day. Last Saturday all "previous records" for Buffalo were broken by the production at this furnace of 226 gross tons of foundry iron. The product on the day before and the day after was 209 and 219 tons respectively. The average production for the past half month was 205 gross tons per day. When rebuilding, the works were planned to be the most perfectly equipped furnace in the country.

The Pottsville Iron and Steel Company's rolling mill, at Hamburg, in Berks County, Pa., which was idle for some time because of trouble with the Amalgamated Association, and then resumed operations with non-union hands, on Monday went on double turn.

The Keystone Bridge Company of Pittsburgh have been awarded a contract for bridge work, aggregating 19 spans, to be erected on the line of the Toledo, Walhonding and Ohio Railroad. One of the bridges will contain 10 spans. The above firm are laying a number of tracks on a plot of ground near their works, on which a steam crane of the Yale & Towne design will be erected to travel from the works to the Allegheny Valley Railroad tracks. The building of this crane will greatly facilitate the loading of material.

S. R. Smythe & Co., engineers and contractors, Lewis Block, Pittsburgh, Pa., have several large contracts on hand, among them being an order for a complete fuel gas plant for the Howard Plate Glass Company, Cochran Station, Pa., which consists of 20 gas producers, 500 feet of underground gas sewer and about 1200 feet of sheet-iron pipe, and all necessary gas connections for running this entire plant with artificial fuel gas, and it is expected the whole plant will be in operation early in December. They have also closed their second contract with the Lukens Iron and Steel Company of Coatesville, Pa., consisting of a complete open-hearth steel plant to contain six furnaces and all necessary gas producers, gas connections, &c. This firm consumes over 1000 tons of steel per week, which is made into boiler plate, &c., all of which has heretofore been purchased in the open market. They have now decided to make their own steel, and it is expected that two of these furnaces will be in operation not later than January 1, 1892, and the others as soon as they can possibly be built. As before stated, this is the second order received from this firm by S. R. Smythe & Co. They have already completed the furnaces and producer plant for their plate mill, which is one of the largest in the country, rolling plates up to 120 inches wide.

At a meeting of the blast furnace operators of the Mahoning Valley, held in Youngstown, Ohio, on Thursday, the 8th inst., it was decided to grant a general advance of 10 per cent. in wages to all blast furnace employees, to go into effect on Monday, the 12th inst.

The Star Forge at the Albany Iron Works, Troy, N. Y., was started Friday.

The Burden Mills and also those of the Troy Steel and Iron Company are now in full blast at Troy, N. Y.

Improvements and alterations are being carried out on a large scale at the furnace of the Franklin Iron Mfg. Company, at Franklin Iron Works P. O., Oneida County, N. Y. The furnace was blown out on the 17th of last August, after being in continuous operation for three years and three months. The most conspicuous improvement is the new stockhouse, which is 205 x 84 feet in size, and is covered by a hip roof of corrugated iron 56 feet in height. At the rear is storage room for 60 cars, while the space for storing coal, coke, ore and limestone will be ample. The structure is of new and peculiar design, being made with iron plates at the ends of the timbers, and

so constructed that almost any portion of it can be removed without disturbing any other portion. The stack and ovens are being relined throughout, the engine room enlarged, and alterations made in the boiler room. The company are also building a new dock for loading ore into cars, and the iron which has formerly been drawn from the casthouse by mules will hereafter be drawn by locomotives. The foundry is also being enlarged, with a view to increasing the facilities for turning out sash weights, for which the company have an enviable reputation. Surveys are being made between the works and the company's mines with a view to adopting the Bleichert system of overhead rope tramway if considered feasible. If this system is not adopted, it is probable that a narrow-gauge road will be built.

The Star and Crescent Furnace, at Rusk, Texas, has been completed and will be started up at an early day.

The stockholders of the Pennsylvania Steel Company, Steelton, Pa., recently held their annual meeting at the office of the company, in Philadelphia, when the following directors were elected: Luther S. Bent, Edmund Smith, H. H. Houston, William M. Spackman, Eben F. Barker, Charlesmagne Tower, Jr., Wayne MacVeagh. The directors elected these officers: President, Luther S. Bent; vice-president, Eben T. Barker; secretary and treasurer, Edmund N. Smith.

The Valley Iron Works of Williamsport, Pa., which had made an arrangement with the West Lynchburg Land Company to remove its plant to Lynchburg, Va., will probably remain in Williamsport if capital stock to the amount of \$50,000 is taken by the latter place.

The Washington, N. C., Iron Works have been burned, at a loss of \$5000.

The new furnace of the Raney & Berger Iron Company, at New Castle, Pa., is about completed.

At Seattle, Wash., the Pacific Iron and Steel Company have been organized, with a capital stock of \$60,000.

The Illinois Bolt and Nut Works of Peoria, Ill., have absorbed the Peoria Rolling Mill Company, and will use the plant hitherto occupied by the latter company.

On Saturday last there were on the rolls of the Fischback mill of the Pottsville Iron and Steel Company 654 names, while the full complement is 1000. All the departments of the mill are running full, single turn, except the puddling mill, whose last two double furnaces were to receive their crews this week.

The Lincoln-Bessemer Iron Company's effects, in Warren County, N. J., have been sold by the sheriff for \$2550.

The Chicago Wire and Spring Company are building new mills at Wireton Park, Ill., a suburb of Chicago and a new manufacturing town. The new plant consists of five buildings. The largest is the wire mill, which is 750 feet long by 150 feet wide, and is claimed to be the largest wire mill building in the country. The spring shop is 250 x 250 feet. The other buildings are the cooper shop, machine shop and chemical house. Power will be furnished by a Reynolds-Corliss engine of 1000 horse-power, supplied with steam by two 500 horse-power Hazleton tripod boilers. The works will have a daily capacity of 225 to 250 tons of springs, wire link belting and all kinds of wire and wire nails. The Chicago office is at Lake and La Salle streets.

We have already noted the fact that application for a charter has been made by the Allequippa Steel Company of Pittsburgh, which company propose to erect a steel plant at Allequippa, Pa., on the line of the Pittsburgh and Lake Erie Railroad, 22 miles from Pittsburgh. We can now state that application has been made for a charter for the J. A. Russell Shovel Company, which company will be identified with the Allequippa Steel Company, and their works will be located adjacent to the plant of the Allequippa Steel Company. The steel company propose to make steel by a secret process, and the product will be utilized by the company in the manufacture of shovels by a patent method. Alexander M. Nepper of Pittsburgh is attorney for both these concerns.

It is reported that the Cleveland Rolling Mill Company are about to erect two additions, one a new Bessemer steel plant. At present they have but one Bessemer steel plant, which has been in operation over 20 years supplying ingots for the blooming mills and rolling mill. Some few years ago, when it became apparent there was no market for steel rails in Cleveland, the rail mill was changed in such a manner that it could turn out beams and other heavy material. The company's business in this sort of manufactured steel soon extended beyond the limits of their capacity. This year has witnessed even a greater increase than before, and the building

of a new Bessemer works has been decided upon. It will contain the very latest and most substantial machinery. The other extension will give the Cleveland Rolling Mill Company one of the largest wire plants in the United States. There are already four large rod mills in operation, but they are separated from the wire department by the Cleveland and Pittsburgh Railroad, while with the new mill the wire as drawn out can be passed into the cleaning house by one continuous motion, thus doing away with teaming.

The new galvanizing plant of the Britton Iron and Steel Company of Cleveland, Ohio, is nearing completion.

Machinery.

The A. Garrison Foundry Company of Pittsburgh recently shipped to Somers Bros., Brooklyn, N. Y., a complete equipment for the new tin-plate plant which the latter firm are building. The order includes an 18-inch mill, consisting of a hot and cold train, the former having six pairs of rolls and the latter three pairs; the shipment weighed about 150 tons. A 700 horse-power engine will run the mill. The A. Garrison Foundry Company have also shipped recently a 34-inch plate mill to the Wellman Iron and Steel Company, Thurlow, Pa., to roll sheets up to 126 inches wide. The pinion housings and caps weighed 31 tons each and the roll housings 36 tons each.

The new foundry of the Noyes & Nutter Mfg. Company at Bangor, Maine, has been put in operation. The plant consists of six buildings, thoroughly equipped with the most improved machinery.

A new foundry building, 80 x 110 feet, has just been completed at the Carpenter Steel Works, Reading, Pa. An addition to be used as a machine shop is about completed and other improvements are being carried out.

The Morrison Foundry at Stellarton, N. S., has been burned, at a loss of \$30,000.

The American Foundry Company at Edison, Wash., will erect a plant for the manufacture of car wheels of all kinds.

The works of the Highland Foundry Company at Roxbury, Mass., have been destroyed by fire. The loss is estimated at \$20,000, partly covered by insurance.

The Totten & Hogg Iron and Steel Foundry Company of Pittsburgh, Pa., have within the last few months booked orders for 51 rolls, nearly all of which are large chill rolls, many of them to be turned and finished complete. The firm also have a large number of orders on hand for a Blake ore crusher, of which they are the sole manufacturers in this country.

John C. Kelly will build a foundry 184 x 90 feet in size at Nicetown, Philadelphia.

The J. H. Kerrick Machinery Company have filed articles of incorporation at Minneapolis, Minn. The capital is \$50,000, and the business will be that of manufacturing iron and wood working machinery.

The foundry of the H. B. Smith Company at Westfield, Mass., has been damaged by fire to the extent of \$35,000; insured.

The Wichita Iron Foundry and Machine Works have been chartered at Wichita, Texas, with a cash capital of \$250,000.

It is probable that Milwaukee, Wis., will be chosen as the location for the new works of the Bucyrus Steam Shovel Company of Bucyrus, Ohio. The company have been contemplating removal for some time, and their officers have visited several cities with a view to selecting a site. It is believed, however, that Milwaukee will be chosen on account of the admirable facilities offered by that city. Should the works be built there the building of tugs will be added to the present business of building steam shovels and dredges.

The Johnson Company, Johnstown, Pa., have recently ordered from the Ball Engine Company, Erie, Pa., a 60 horse-power engine, being the twenty second engine built by them for the Johnson Company, aggregating over 3000 horse-power.

The Skinner Chuck Company of New Britain, Conn., are occupying their new brick factory, which has been equipped with new machinery and tools especially designed for the manufacture of chucks.

The Etna Foundry and Machine Company have been formed at Springfield, Ill., with a capital of \$15,000, to operate a foundry and machine works at that place.

Hardware.

The Deposit (N. Y.) Mfg. Company are now busy shipping their sleds and snow shovels. The season's output of sleds will be, it is estimated, about 30,000.

E. T. Barnum, the well known manufacturer of art wire and iron work, of Detroit, Mich., is completing an order for an iron fence 1000 feet long and 6 feet high for a schoolhouse in Mississippi.

Heidel Mfg. Company, St. Louis, Mo., manufacturers of Heidelberg's Cold-Handle Fad Iron, report a steady increase in their trade. While this iron has only been on the market a short time, it has already grown popular with the trade. The company advise us they are now in a position to fill all orders promptly and solicit inquiries from those interested.

Parlin & Orendorff Company, Canton, Ill., have just commenced the erection of a new three-story brick building, which they intend to make fire proof. This building will be 72 x 132 feet, and is to be used as a warehouse. Their increasing business in manufacturing agricultural implements made this addition to their plant a necessity.

The A. M. Dolph Company, Cincinnati, Ohio, have recently removed their offices and warehouses to their new factory, Nos. 166 to 180 West Pearl street. They call attention to their enlarged facilities for the manufacture of laundry machinery, having a plant equipped and used exclusively for building this line of machinery. They are also engaged in the manufacture of wagons, using the Cook short turn gear.

Chadborn & Coldwell Mfg. Company, Newburg, N. Y., have their new factory for the manufacture of lawn mowers nearly completed and expect to occupy it early in November. A circular which they have recently issued gives a view of the factory and indicates its extent and the completeness of its equipment.

The organization of the Thomas Coldwell Lawn Mower Company, Newburg, N. Y., is announced. The following officers have been chosen: President, Thomas Coldwell; treasurer, A. W. Mapes; secretary, Wm. W. Coldwell; directors, Thomas Coldwell, William Wright, J. Howard Sweetzer, J. N. Jordan and A. W. Mapes. Active preparations are being made for the manufacture of lawn mowers on a large scale.

The annual meeting of the Eureka Mower Company, Utica, N. Y., was held at the company's office October 6. The following trustees were elected: J. F. Lowery, Lewis B. Williams, William Blaikie, James H. Williams, Philo S. Curtis, Alexander B. Roberts, A. L. Simmons, Harrison Gilmore, John A. Roberts, Edward Norris, F. G. Weaver, O. J. Childs and H. J. Cookinham.

Miscellaneous.

The Florence Zinc Works, recently built by the Lehigh Zinc and Iron Company of Bethlehem, Pa., commenced operations last week. Mr. Reinhardt, the German expert, who came over to build these works, intends to remain here permanently to superintend them.

A factory for the manufacture of street cars is talked of for Brockton, Mass.

The Secretary of State of Illinois has issued licenses for the incorporation of the following new companies: The Hirsch Aluminum Bicycle Company, at Chicago; to make bicycles; capital stock, \$250,000; incorporators, O. M. Wells, E. A. Holmes and G. Wisslack. Acme Light, Heat and Power Company of Illinois, Chicago; capital stock, \$2,000,000; incorporators, George S. Knopp, James A. Turner and Simeon J. B. Bear. The Suburban Light, Heat and Power Company, Chicago; capital stock, \$50,000; incorporators, Louis W. Johnson, Ernest C. Barrows and Henry C. Joslin. Watkins Wire Company, Lockport; capital stock, \$150,000; incorporators, Milton W. Watkins, Henry G. Watkins and William C. Goodhue. Quincy Varnish Company, Quincy; capital stock, \$10,000; incorporators, Myron E. Lusk, William W. Castle and Leonard M. Schmidt.

F. W. Wheeler & Co. of Bay City, Mich., have closed a contract for the construction of a large steel propeller for Callenbeck *et al.* of Saginaw, Mich. The new boat will be 345 feet over all, 42 feet beam, and 25 feet 6 inches molded depth. The boat will be after the same pattern as the steel steamship Emily P. Weed, and will be the largest steel freighter on the lakes, being 14 feet longer than the E. C. Pope. The two steamships that the Minnesota Iron Company are likely to build at South Chicago this winter will be 350 feet long and 45 feet wide, with over 4000 tons of capacity. With 20 feet of water all of these boats are good for 5000 tons.

The American Spelter Company, at Chicago, have been licensed under the laws of Illinois to manufacture zinc and lead products, &c. Capital stock \$300,000. Incorporators, H. Burkholder, Leon Goldman and S. E. Magill. The company will erect a plant at Galena, Kan., for which they are now purchasing equipment. The company's office is in the Gaff Building, Chicago.

The American Heat Insulating Company, a concern organized about four years ago, and who have a plant on the South Side, Pittsburgh, have decided to wind up their affairs,

sell their property and retire from business. Dull trade in their special line of manufacture is given as the reason for their dissolution.

It is announced that the Laclede Car Company of St. Louis, Mo., will build 375 street cars for the Third Avenue Street Railway of New York, on which the cable system is now being introduced. Two hundred of these will be closed and the remainder open, the former to be delivered in November, 1892, and the latter in May of the same year.

The Buffalo Spring and Gear Company will build a new six-story building at Buffalo, N. Y. The dimensions of the new factory will be 85 x 50 feet, and the structure will be as near fire proof as it is possible to make it. The company have outgrown their old quarters, and a larger plant was necessary in order to meet the demands of trade.

Since the incorporation of the Bostwick Steel Lath Company at Niles, Ohio, in July last, sales have been made in many of the principal cities of the United States, and since commencing operations that concern have used over 287,000 pounds of steel. The firm are now placing their lath on the large eight-story building owned by J. F. Downing, at Erie, Pa.; the Telephone Exchange Building at Pittsburgh, which is about completed; also in the Government Building, at Nashville, Tenn., and a large Government Building at Salina, Wis. The works of the firm are operating on full time and they report plenty of orders on hand.

The Florence Zinc Company of Freemansburg, Pa., have been chartered at Harrisburg, with a capital of \$250,000.

The Campbell Frog Works, at Bucyrus, Ohio, have been sold by the assignee to Judge F. Hipp. It is stated that a stock company will be formed to operate the works.

Licenses to incorporate under the laws of Illinois have recently been issued to the following: The Martin Car Coupler Company, at Chicago, to manufacture car couplers; capital stock, \$1,000,000; incorporators, Alex. C. Marvin, Flavius J. Barber and J. M. Corrigan. C. H. B. Sheet Milling Company, at Chicago, to manufacture galvanized sheet iron; capital stock, \$100,000; incorporators, W. E. Stockton, James Buckley and W. R. Wagner. Aurora Ornamental Quartz Building Block Company, at Aurora, to manufacture building blocks; capital stock, \$100,000; incorporators, H. H. Evans, Frank Wall and others. Waukegan and North Shore Rapid Transit Company, at Waukegan, to operate a street railway; capital stock, \$100,000; incorporators, George P. Washburn, A. E. Holt, W. O. Jones and F. B. Benton. Acme Railway Signal and Mfg. Company, at Galesburg, to manufacture railway torches, torpedoes, &c.; capital stock, \$50,000; incorporators, W. H. Miller, J. G. Bohl and Emil Lange. The Greiner Economical Cupola Company, at Chicago, to make cupolas; capital stock, \$50,000; incorporators, T. A. Wigham, H. C. Sparr and C. F. Dickey. The Danville Weigher Company, at Danville, to manufacture grain weighers; incorporators, R. D. McDonald, J. H. Poulter and C. T. Yeomans. The Cyclone Bicycle Mfg. Company, at Chicago, to manufacture bicycles; capital stock, \$1,000,000; incorporators, F. C. Foster, E. Erskine McMillan and J. H. Breese. The Coleman & Ames White Lead Company, at Chicago, to manufacture lead products; capital stock, \$150,000; incorporators, G. D. Coleman, K. L. Ames and G. A. Mariner. Lindsley Terminal Equipment Company, at Chicago, to manufacture railway and other equipments; capital stock, \$100,000; incorporators, Peter S. Grosseup, F. L. Wean and H. R. Pebbles. The Van Auker Engineering Company, at Chicago, to manufacture water and steam appliances; capital stock, \$500,000; incorporators, Bynn E. Van Auker, Joseph A. Long and D. W. Parker. A certificate was filed increasing the capital stock of the Illinois Malleable Iron Company, at Chicago, to \$200,000.

The citizens of Marion, Ind., have subscribed for \$400,000 of stock of the gun factory which Dr. Richard Gatling proposes to erect at that place. The total capital will be \$1,000,000, of which \$400,000 will be retained by the originator of the scheme.

Frank C. Roberts, civil engineer, of Philadelphia, is preparing plans and specifications for a new blast furnace, to be built by the Pottsville Steel and Iron Company, at Pottsville, Pa.

J. Fred. Kilburn, for some time past the representative in New England of Hugh W. Adams & Co., pig iron merchants, of New York, has recently opened an office in the interest of the same firm at 55 Westminster street, Providence, R. I.

TRADE REPORT.

Chicago.

(By Telegraph.)

Office of The Iron Age, 50 Dearborn street, CHICAGO, October 14, 1891.

Pig Iron.—The volume of business in Coke Iron is satisfactory. Every house here reports a steady run of orders ranging from carload lots up to 1000 tons, with plenty of business still in sight. Southern Coke holds its own better than had been anticipated with the enlarged supply of local Coke, which seems to indicate an increased consumption of Pig Iron in this section. Competition for trade is lively with so many sellers in the field, but there is no fight for supremacy. An occasional concession is made in the price of local iron to win a new customer, and No. 3 Southern has suffered a little in price, but on the whole values are well maintained. The position of Southern furnace companies represented here has been greatly improved by very heavy sales made in Detroit a fortnight since, and agents are being held strictly to prices named by the makers, with no discretionary powers. Quite a number of the Southern companies are asking higher prices for next year's delivery, believing that the good condition of general business must result before long in an upward movement in Pig Iron. Lake Superior Charcoal is no better than it was last week; small sales have been made at \$17, which now seems to be the general price, with sellers quite discouraged as to the outlook for the future. Bessemer Pig Iron is quiet and nominally quoted at \$17. Quotations are as follows, f.o.b. Chicago:

Lake Superior Charcoal.....	\$17.00 @	\$17.50
Local Coke Foundry, No. 1.....	15.50 @	16.00
Local Coke Foundry, No. 2.....	15.00 @	15.25
Local Coke Foundry, No. 3.....	14.50 @	15.00
Local Scotch.....	16.00 @	16.50
Ohio Strong Softeners.....	17.75 @	18.25
Southern Coke, No. 1.....	15.75 @	16.25
Southern Coke, No. 2.....	15.00 @	15.25
Southern Coke, No. 3.....	14.25 @	14.50
Southern, No. 1, Soft.....	15.00 @	15.75
Southern, No. 2, Soft.....	14.50 @	14.75
Southern Gray Forge.....	14.00 @	14.50
Southern Mottled.....	13.50 @	14.00
Tennessee Charcoal, No. 1.....	18.00 @	18.50
Alabama Car Wheel.....	20.50 @	21.50
Coke Bessemer.....	17.00 @	17.50
Hocking Valley, No. 1.....	17.00 @	17.50
Jackson County Silvery.....	17.50 @	18.00

Spiegeleisen.—In fair demand for small lots at unchanged prices—viz.: \$28 for 20 % and \$38 for 30 %.

Bar Iron.—Manufacturers report a more active market. Several car orders calling for 300 to 600 tons each have been placed. More car orders are in sight, but still this class of trade falls far short of what it should be. Inquiries have been received from implement makers for quantities ranging from 300 to 1000 tons. All of these placed season contracts some time since, but now find that they need still more material. They are not inclined to pay the price now ruling, but if they really need the Iron they will probably be compelled to do so, as the market is very firm. This is shown by the closing of a number of small contracts the past week by parties who have been shopping for some time without avail. Valley mills have secured orders at last—1.60¢ at mill, or 1.75¢ here. Quotations are 1.75¢ @ 1.80¢, Chicago, according to the character of the order.

Plates.—Mill business has fallen off decidedly. A few large lots are being talked about, but are slow to come in the market. Tank Steel is selling at the old low prices, and Flange Steel is now suffering from excessive competition. Large lots can be shaded 2½¢, Chicago. Store trade is lighter, but prices are unchanged, except Sheet Iron, which we quote 2.50¢ @ 2.60¢.

Sheets.—Inquiries for Black Sheet are again being received by mill agents, but not many of them are in position to quote, as their works are well employed. The price asked is about 2.95¢, Chicago, for No. 27. Jobbers quote 3.20¢ from stock. Galvanized Iron is in more demand than at any time this fall, and manufacturers are obliged to let orders pass because they cannot fill them. Prices are on the upper grade. Jobbers ask 60 and 10 ¢ for Juniata.

Merchant Steel.—Tool Steel is moving quite actively, with a steady increase in the railroad trade, at 6½¢ upward, according to quality. Cheap Steels are in fair demand, but not so active as a short time since. Prices are unchanged.

Track Supplies.—The Steel Rail trade has not improved, small lots only now being called for, on which quotations range \$30.50 @ \$33, according to terms, delivery, &c. The report from English sources that 5000 tons have been sold on American account for delivery in New Orleans is not credited here, although it is conceded that domestic and foreign prices would be very close for that delivery. Small sales of Splice Bars have been made on private terms. The open price is 1.85¢. Track Bolts are quiet, with 2.75¢ named for Hexagon Nut. Spikes are nominally worth 2.20¢ @ 2.25¢.

Old Rails and Wheels.—A small lot of light Iron Rails brought \$22.50, Milwaukee, but no sales are reported of heavy sections. Eastern consumers offer \$22, Chicago, but this is below sellers' views. Old Steel Rails are neglected, but nominally quoted \$14 @ \$16, according to length. Old Car Wheels are quiet, with prices running about \$16 @ \$16.25.

Scrap.—Trade continues very light and prices have receded slightly. Dealers quote selling prices @ net ton: No. 1 Railroad Forge, \$19; No. 1 Forge, \$18; No. 1 Mill, \$13.50; Fish Plates, \$21.50; Car Axles, \$23.50; Horse Shoes, \$17.50; Light Iron, \$8.50; Machinery Cast, \$12 @ \$12.25; Stove Plate, \$8.50; Cast Borings, \$7 @ \$7.25; Wrought Turnings, \$9.50 @ \$10; Axle Turnings, \$12.50; Mixed Steel, \$10.50; Coil Steel, \$14; Leaf Steel, \$15; Tires, \$15.50.

Metals.—Copper is slightly lower, Lake being quoted 12½¢ and casting brands 12¢ @ 12½¢ in carload lots. A brisk trade is reported in casting brands, with rumors current of large producers to shut down soon on account of the scarcity of matte. Little is doing in Spelter, which is stationary at 4.85¢ @ 4.90¢ for prime Western. Pig Lead is comparatively quiet, with sales of some 500 tons at 4.35¢ @ 4.40¢.

Cleveland.

CLEVELAND, October 12, 1891.

Iron Ore.—The Ore men have finally succeeded in forcing down the Ore rate from Escanaba from \$1.15 to 75¢, while the charges from Marquette, Ashland and Two Harbors are correspondingly low. These reductions have put considerable new life into the market. Some dealers report sales of both Bessemer and Non-Bessemer Ores, and others say they have had a very good demand. It is now estimated that not over 250,000 or 300,000 tons of Ore are yet to be sold this season, the aggregate sales to date being estimated at considerably over 6,000,000 tons. About 80,000 tons of new Ore have been unloaded at Cleveland during the past week, and over 200,000 tons at all Lake Erie ports. In fact, the efforts of the Ore men to get down their output for 1891 before the close of navigation is something unprecedented. Unless cold weather cuts off lake shipments unusually early about all the Ore purchased this year will have been unloaded on the docks when the

season ends. For the past seven days the shipments to the furnaces are 10,000 tons in excess of the shipments for the corresponding week in 1890. Talk regarding prices for 1892 is now heard. Every possible effort will be made to keep down vessel rates and to make the prices to buyers correspond with the early season rates this year.

Pig Iron.—The market is steadily gaining strength. There have been sales of Bessemer Iron during the week just closed at prices very close to \$16, and Mill Irons have been let go at about \$14. Dealers believe that they have every reason for anticipating a substantial improvement in the market in every way within a very few weeks. There is not very much new to report beyond the fact that prices are firmer than for many weeks past and that all the talk is in favor of better prices. Consumption seem to be steadily gaining on production. Local quotations:

Nos. 1 to 6 Lake Superior Charcoal	\$18.50 @ \$19.00
Nos. 1, 2 and 3 Bessemer, per ton.	16.00 @ 16.25
No. 1 Strong Foundry, per ton.	16.20 @ 16.70
No. 2 Strong Foundry, per ton.	15.20 @ 15.70
No. 1 American Scotch, per ton.	16.20 @ 16.70
No. 2 American Scotch, per ton.	15.20 @ 15.70
No. 1 Soft Silvery, per ton.	16.50 @ 17.50
Mahoning and Shenango Valley	
Neutral Mill Irons, per ton.	14.00 @ 14.50
Mahoning and Shenango Valley	
Red Short Mills, per ton.	14.00 @ 14.50

Old Rails.—There have been a few sales, but the market is not very firm; the demand is not equal to the supply. About \$23 is the average price paid.

Nails.—The market is not very firm; indeed, no very large amount of business is looked for just at present. Steel Wire Nails are still selling at \$2 from stock, with a fair demand. Steel Cut Nails are quoted at \$1.70.

Scrap.—The market is strong on the basis of \$19.50 for No. 1 Railroad Wrought. Other prices are correspondingly firm.

Cincinnati.

(By Telegraph.)

Office of *The Iron Age*, Fourth and Main Sts.,
CINCINNATI, October 14, 1891.

The general tone of the market is more confident, with a largely increased volume of business and at better prices. There have been several sales of considerable magnitude, mainly of Gray Forge and No. 3 Foundry Iron, which reach 28,000 tons, and smaller lots which in the aggregate reach 30,000 tons. These sales were for delivery running from November until next June at \$10 at the furnace for Gray Forge and \$10.50 for No. 3 Foundry. There were also about 8000 tons of Southern Charcoal Car-Wheel Iron sold at \$16 @ \$16.50 at the furnace. The market is now pretty well cleaned up of low priced iron, and a decidedly better feeling prevails, with higher prices asked all along the line. While it is possible that \$10 could be shaded for Gray Forge at the furnace for delivery this year, it is pretty certain that it could not be for delivery during the early months of next year, and for the last half of next year there is a large inquiry, but sellers refuse to name prices. On the consumption side of the market there is a further increase in the melting of iron by the pipe works, and the railroads have placed orders for new cars and for the repair of old rolling stock. Stove foundries and the jobbing foundries are working more actively, and in the aggregate their consumption of iron is largely increased. We quote as follows:

Southern Coke, No. 1.	\$15.25 @ \$15.75
Southern Coke, No. 2.	14.00 @ 14.50
Southern Coke, No. 3.	13.25 @ 13.50
Ohio Soft Stone Coal, No. 1.	16.20 @ 17.00
Ohio Soft Stone Coal, No. 2.	15.50 @ 16.50
Mahoning and Shenango Valley.	17.00 @ 17.50
Hanging Rock Charcoal, No. 1.	20.00 @ 21.00
Hanging Rock Charcoal, No. 2.	19.00 @ 20.00

Tennessee and Alabama Charcoal,	
No. 1.	16.00 @ 17.00
Tennessee and Alabama Charcoal,	
No. 2.	15.00 @ 16.00
Forge.	
Gray Forge.	12.75 @ 13.00
Mottled Neutral Coke.	12.25 @ 12.50
Car Wheel and Malleable Irons.	
Standard Southern Car Wheel.	19.25 @ 19.75
Hanging Rock, Cold Blast.	25.00 @ 26.00
Lake Superior Car Wheel and Malleable.	18.00 @ 18.50

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St.,
PHILADELPHIA, Pa., October 13, 1891.

The week has not developed anything very encouraging in the iron trade, and on the whole the market has probably lost something of the buoyancy noted two or three weeks ago. No one supposes that the reaction is likely to be of long duration, but in the meantime there is no use denying the fact that there is a reaction. Business is not specially dull, but the eagerness to secure what there is tends to weaken prices, and weak prices usually lead to weak buying. For the present, therefore, there is more hesitancy among buyers and greater urgency among sellers, the net result being concessions of some importance whenever desirable orders are in sight. This is supposed to be largely due to the weakness in steel of various kinds, and until there is an improvement in this direction there is very little use looking for it elsewhere. Nearly everything is being worked to full capacity, except the steel mills and furnaces supplying material for that class of trade, and the disproportion is beginning to make itself felt. The trade appears to be strongly imbued with this idea, that no attempt will be made to push things until the large steel works get busier. Production may have been increased somewhat prematurely, but if the rail trade picks up as it ought to do there will not be much danger of overproduction. At the moment lower prices than have been seen for a long time past would be accepted for this year's deliveries, but large buyers are more inclined to bid for 1892, as requirements for the current year have been pretty well covered.

Pig Iron.—Whatever of strength there is in the iron market appears to be confined to pig iron. Not that prices are higher, but they are steady, and with no indications of an undue pressure to realize. At quoted rates there is plenty of iron of all kinds, but bids at 25¢ less are not received with much favor, and it is only once in a while that concessions of that kind can be had. Holders appear to be very confident of their position, and as the output for the balance of the year is pretty well engaged, there is no immediate reason why sellers should accept additional business unless at full quoted rates. New furnaces are preparing to "blow in," however, and from present appearances the output by December 1 will be close on to that of 1890, which was the largest on record. Of course some furnaces will be "blown out," but the probabilities are in favor of a decided increase, making full allowances for those going out. It will be seen, therefore, that the trade are shaping for a greater demand than ever, and although this seems to be pretty well assured, consumers do not feel sufficiently confident to warrant them in paying higher prices, or even in extending very far at today's prices. Consequently there is more hesitancy than we have seen for some time past, although, as we said before, holders seem willing to take their chances of the future, rather than discount it even to the extent of 25¢ per ton. Sales have been chiefly at prices as follows, varying according to brand, point of delivery, &c.:

Ohio Softeners, No. 1x.	\$19.00 @
Ohio Softeners, No. 2x.	18.00 @
Standard Penna, No. 1x.	17.75 @ \$18.00

Standard Penna, No. 2x.	16.25 @ 16.75
Medium Penna, No. 1x.	17.25 @ 17.50
Medium Penna, No. 2x.	16.00 @ 16.25
Virginia, No. 1x.	17.00 @ 17.25
Virginia, No. 2x.	15.75 @ 16.00
Standard Neutral All-Ors Forge	14.25 @ 14.75
Ordinary Forge Cinder mixed.	13.75 @ 14.00
Hot-Blast Charcoal.	20.00 @ 22.00
Cold-Blast Charcoal.	24.00 @ 27.00

Muck Bars.—The market is dull and prices a shade easier. Only small sales have been reported at \$25.75 @ \$26 at mill, and \$26.50 @ \$26.75, delivered. Some holders ask more money, but at prices named the demand is not large.

Steel Slabs and Billets.—The unsettled feeling reported in our last has not been allayed, so that it is difficult to say what the exact position is, except that makers are anxious for orders. Nominal prices are about \$27.50 at the seaboard, but bids of \$27 have been asked for, and in some instances billets have been offered at less than \$27.25, seaboard, and not taken, and there is little doubt that \$27 would be accepted if bid for early specifications. At Harrisburg, or for equivalent deliveries, \$26.50 would secure ample supplies.

Steel Rails.—There is no very decided improvement as yet, although manufacturers report a better inquiry and prospects of larger sales in the near future. Meanwhile mills are fairly employed, and have orders in hand to run them pretty full for the balance of the year. Prices steady and unchanged at \$30 at mills. The Baltimore City Passenger Railway Company have just placed an order for the material for 16 miles of cable road with Messrs. J. W. Hoffman of this city. This is said to be the largest order of the kind ever given out, and includes upward of 3000 tons of Girder and Slot Rails.

Bar Iron.—Demand fair, but not near what was looked for at this season of the year. Mills manage to run moderately full, however, but the orders are small, and there is very little work ahead in case of a falling off in the current demand, so that prices are weak and irregular. Ordinary mill prices are 1.70¢ @ 1.75¢ in the city, and 1.60¢ @ 1.65¢ at interior points, but even these low figures would probably be shaded for the right kind of an order as regards quantity, specification and delivery.

Skelp Iron.—Some inquiry and sales of several hundred tons at 1.72½¢, delivered, and in some instances a still lower figure is mentioned.

Plates.—An extremely weak market is reported in plates, with some sales for boiler work at the lowest figures ever known. Mills are competing sharply for everything that comes on the market, so that quotations as usually given mean very little when it comes to actual business. Of course there is always a question as to what the actual quality may be, but "it goes," and to that extent it unsettles the market. The amount of new business offering is not nearly equal to current deliveries, so that manufacturers are anxious to secure something to fill in vacant places. Nominal quotations, delivered, are supposed to be as follows, but on some of the higher priced material cuts of two-tenths and upward have been made, and about half that on the cheaper class of goods:

	Iron.	Steel.
Tank Plates.	1.90 @ 2.00¢	2.00 @ 2.10¢
Refined.	2.20 @ 2.30¢	2.10 @ 2.20¢
Shell.	2.30 @ 2.40¢	2.40 @ 2.50¢
Flange.	3.20 @ 3.30¢	2.50 @ 2.75¢
Fire-Box.	4.00 @ 4.25¢	3.00 @ 3.50¢

Structural Material.—There is a little more inquiry for both Bridge and Structural work, but there are so many bidding for it that prices are lower than ever. In some cases 2¢, delivered, has been quoted on steel angles, for bridge specifications, and prices in proportion for other articles, so that the condition of the market is far from satisfactory, and at the moment

without much prospect of improvement. Nominal quotations, delivered, are about as follows: Angles, 2¢ @ 2.10¢; Sheared Plates, 1.90¢ @ 2¢, and 10¢ @ 15¢ more for Steel, according to requirements. Tees, 2.5¢ @ 2.6¢; Beams and Channels, 3.1¢ for either Iron or Steel.

Sheet Iron.—There is a fair demand and mills are not accumulating much stock. With cold weather manufacturers are looking for greater activity and in the meantime are holding for the best makes as follows:

Best Refined, Nos. 14 to 20.....3.00¢ @ 3.10¢
Best Refined, Nos. 21 to 24.....3.10¢ @ 3.15¢
Best Refined, Nos. 25 to 26.....3.20¢ @ 3.30¢
Best Refined, No. 27.....3.40¢ @
Best Refined, No. 28.....3.50¢ @
Common, ½¢ less than the above.

Best Soft Steel, Nos. 14 to 20.....3¢ @ 3¼¢
Best Soft Steel, Nos. 21 to 24.....3¼¢ @
Best Soft Steel, Nos. 25 to 26.....3½¢ @
Best Soft Steel, Nos. 27 to 28.....4¢ @
Best Bloom Sheets, ¼¢ extra over the above prices.

Best Bloom, Galvanized, discount.... @ 67½ %
Common, discount..... @ 70 %

Old Material.—The demand does not show much improvement, but sales are made at about the figure quoted below, although the market will not stand much pressure. Iron Rails, \$21.50 @ \$23; Steel Rails, \$17 @ \$18, delivered; No. 1 Railroad Scrap, \$20.50 @ \$21, Philadelphia, or for deliveries at mills in the interior \$21 @ \$21.50, according to distance and quality; \$15 @ \$16 for No. 2 Light; \$14 @ \$15 for best Machinery Scrap; \$13.50 @ \$14 for ordinary; \$14.50 @ \$15.50 for Wrought Turnings; \$9.50 @ \$10.50 for Cast Borings, and nominally \$23 @ \$25 for Old Fish Plates, and \$16 @ \$17, delivered, for Old Car Wheels.

Wrought-Iron Pipe.—There is a fair demand, but prices are low and unsatisfactory. There are no official quotations at present, the rule being "quotations on application and specification," but the following discounts are usually named as about the rates at which business can be done:

Butt-Welded Black.....57½ %
Butt-Welded Galvanized.....47½ %
Lap-Welded Black.....67½ %
Lap-Welded Galvanized.....55 %
Boiler Tubes, 2½ inch and under.....52½ %
Boiler Tubes, 3 to 6 inch.....60 %
Boiler Tubes, 7 inch and larger.....55 %

Pittsburgh.

Office of The Iron Age, Hamilton Building, Pittsburgh, October 13, 1891.

Pig Iron.—There is no improvement to note in demand. The present peculiar position of the local market is unaccountable. There appears to be no falling off in the consumption; the mills are all busy, yet there is not much inquiry for Pig Iron. It was generally expected that there would be an improved demand this month, which was to be followed by an advance in prices; but, as already stated, the improvement has not yet been realized. There is not much Iron offering; city furnaces are pretty well sold up, and there is not much offering from other points, as furnacemen at a distance nearly all report that they can do better at home or elsewhere than in this market. There is a fair volume of business here, but it is claimed that prices are not remunerative. We quote prices as follows:

Neutral Gray Forge.....\$13.75 @ \$13.85, cash.
White and Mottled.....13.00 @ 13.50, "
All-Over Mill.....14.25 @ 14.75, "
No. 1 Foundry.....16.25 @ 16.50, "
No. 2 Foundry.....15.00 @ 15.50, "
No. 3 Foundry.....14.50 @ 14.75, "
No. 2 Charcoal Foundry.....20.50 @ 21.00, "
No. 1 Charcoal Foundry.....21.50 @ 22.00, "
Cold-Blast Charcoal.....25.00 @ 27 00, "
Bessemer Iron.....15.50 @ 15.75, "

There has been scarcely anything done in Bessemer the past week, but so far as we are advised there have been no sales below \$15.50, cash. City furnaces have reported

sales of Neutral Gray Forge at \$13.75, cash, delivered, which means \$13.50 at furnace.

Muck Bar.—There is but little inquiry, and while prices remain unchanged it is evident that the buyer has the advantage. We continue to quote at \$26.25 @ \$26.50.

Manufactured Iron.—While possibly orders are not coming forward so freely as a few weeks ago, the mills are generally busy, some of them unable to meet the demands of their contracts. The valley mills are all well supplied with business and are making little or no effort to secure additional contracts, either for immediate or nearby delivery, as they are not in a position to take them. There is every indication of a good demand throughout the winter, as advices from all parts of the country, so far as relates to business, are of a favorable character. Prices remain unchanged: Bars, 1.70¢ @ 1.75¢; Plate and Tank, 2.05¢ @ 2.10¢, and No. 24 Sheet, 2.75¢, all 60 days, 2 % off for cash. Skelp Iron is still quoted at 1.70¢ @ 1.72½¢ for Grooved, and 1.87½¢ @ 1.92½¢ for Sheared, four months, 2 % off for cash. There is not the demand for Skelp there usually is at this season of the year, which is owing to poor condition of the Wrought-Iron Pipe trade.

Structural Material.—There is a continued active demand for almost everything in this line, and prices are unchanged. The weather for some time past has been all that could be desired and contractors are urgent for material. Prices remain unchanged: Beams and Channels, 3.10¢; Steel Sheared Bridge Plates, 2.15¢ @ 2.20¢; Angles, 2¢; Tees, 2.60¢; Universal Mill Plates, Iron, 2¢ @ 2.05¢; Refined Bars, 1.80¢ @ 1.85¢.

Steel Plates.—The improvement in demand noted in our last report continues, and for some articles in this line it is difficult to get orders placed for immediate or near-by delivery. Prices remain unchanged: Fire Box, 3.85¢ @ 4.25¢; Tank, 2.05¢ @ 2.10¢; Shell, 2.75¢; Flange, 2.40¢ @ 2.50¢.

Merchant Steel.—While prices remain unchanged, a better demand is reported. Crucible Tool Steel, 6¼¢ @ 7¢; do. Machinery, 4¼¢ @ 5¢; do. Spring, 4¢; Bessemer Machinery, 2.30¢ @ 2.40¢; Toe Calk, 2.40¢ @ 2.50¢; Tire Steel, 2.20¢; Steel Bars, 1.80¢ @ 1.85¢.

Barb Wire.—Is quoted at \$3 for Galvanized and \$2.50 for Painted, in car lots; less than car lots, 5¢ @ 100 lb more. In regard to Oliver & Roberts Wire Company, who have asked an extension from their creditors, it is probable that their request will be granted, and there is not much doubt the crippled firm will be able to get through.

Nails.—There is continued demand for Cut Nails and with a small supply and light production the market is firmer, but we continue to quote at \$1.60 for 30¢ average, 60 days, 2 % off for cash. In regard to Wire Nails, while there is a fair business there is not apparently as good demand as there is for Cut Nails, and while \$1.85 is still the price quoted for large lots f.o.b. at factory, it is intimated that they can be bought for \$1.80, 60 days, 2 % off for cash. So far as we are advised manufacturers are quoting at \$1.85, and some of them say they will not sell below that figure.

Wire Rods.—There is some inquiry, but there have been no recent sales reported, in the absence of which we continue to quote at \$35, cash, at makers' mill. It is intimated that there is an effort being made to bear the market, but, if so, it will not amount to much, as there are only a few rod mills and rod manufacturers are well informed in regard to the situation.

Wrought-Iron Pipe.—There is a fair degree of activity, but it is not what it has been at this particular time for several years past, which is owing to the fact in large part that there is nothing like the demand from natural gas companies. Prices remain about as last quoted. Discounts on Black Butt, 57½ %; Galvanized do., 47½ %; Black Lap, 67½ %; Galvanized do., 55 %; Casing, all sizes, 55 %. The next regular meeting of the Manufacturers' Association takes place on November 4.

Old Rails.—There has been a considerably increased business the past week, and the market is firmer, with higher prices for Iron Rails, of which sales were reported: 300 tons at \$23.75; 900 do. at \$24, and 1800 tons at \$24.50, making in all 3000 tons. Sales 1200 tons Steel Rails for remelting at \$18 @ \$18.50.

Billets and Slabs.—There is a continued fair demand for Steel Billets, with sales at \$25, f.o.b. at makers' mill, for round lots, and \$25.25 @ \$25.50 for smaller lots. The mills both here and at Wheeling are pretty well sold up.

Railway Track Supplies.—There is a continued good demand and no change in prices, which we continue to quote as a week ago. Spikes, 2.10¢ @ 2.15¢; Splice Bars, 1.75¢ @ 1.85¢; Track Bolts, 2.70¢ with Square and 2.80¢ with Hexagon Nuts. Some manufacturers report having all they can possibly do and more too.

Steel Rails.—Local makers firm, with a continued good demand, and the mill at Braddock is working up to its full capacity. We continue to quote at \$30, cash, at mill.

Ferromanganese.—Demand continues and the local market is firm at \$66.50, cash, at which sales of 650 tons of 80 % domestic were reported.

Old Material.—There is a fair demand for No. 1 Wrought Scrap, with sales at \$19.50 @ net ton; Cast Scrap, \$13.50, gross; Leaf Spring Steel, \$20 @ \$21, gross; Steel Rail and Bloom Ends in demand and higher, with sales at \$18.

Connellsville Coke.—No change in prices, which have not varied since the strike. Cars are not as plentiful as they were, but consumers have no great reason to complain.

Louisville.

LOUISVILLE, KY., October 10, 1891.

Pig Iron.—After the free buying of last week there has not been the same demand for Iron and trade has been rather quiet, save in sections of the country that were delayed in buying. Iron is stronger than a week ago, and purchases cannot be made on the low basis that has been ruling for the last few months. \$10 @ \$10.25 for Gray Forge, at the furnace, for deliveries this year, is the market price, and there are buyers for deliveries into next year who are willing to pay basis of \$11.25 @ \$11.50 for No. 2 Foundry, at furnace. Furnaces, however, being so well sold up, are not inclined to book many orders at any price, but those wishing to sell realize that the above figures are fully the market and will take orders upon such basis. Car-Wheel Irons are in stronger demand, and sales have been made for delivery through four or five months at an advance in price. Buyers, however, are pursuing a conservative policy that is more noticeable than for many years past, in the face of the extraordinary crops and the prices the market is paying for them. We quote for cash, f.o.b. cars Louisville:

Southern Coke, No. 1 Foundry... \$14.50 @ \$15.00
Southern Coke, No. 2 Foundry... 13.75 @ 14.25
Southern Coke, No. 3 Foundry... 13.25 @ 13.75
Southern Charcoal, No. 1 Foundry 16.00 @ 17.00
Southern Car Wheel..... 18.50 @ 20.00

St. Louis.

OFFICE OF *The Iron Age*, 214 N. Sixth st., }
St. Louis, October 13, 1891. }

Pig Iron.—The market maintains the position it assumed a few weeks since, and has not lost or gained anything worth speaking of during the time mentioned. Consumption keeps abreast of production, and no surplus stocks are being piled up which would perhaps affect the market at a later period. An advance at from 25¢ to 50¢ per ton is asked, and sales are made on this basis. A number of small orders have been placed during the past week, some of them from concerns who usually purchase in large quantities, and the inference is that consumers are not as yet decided about the future, and are merely buying to cover present requirements. When the condition of the market is taken into consideration this course is to be commended, and just now the only safe one to adopt. Some furnaces are pretty well sold up for the balance of the year and, at the present, are out of the market so far as next year's delivery is concerned, and will consent to negotiate for next year's delivery at prices that are from 25¢ to 50¢ above those ruling to-day. The result is that few orders have been placed for delivery later than the present year, and unless there is a radical change furnaces will open the new year with comparatively few orders. As stated above, sales have been made in moderate quantities at the following prices, which are for cash f.o.b. St. Louis:

Southern Coke, No. 1 Foundry,	\$15.50 @ \$15.75
Southern Coke, No. 2 Foundry,	14.50 @ 14.75
Southern Coke, No. 3 Foundry,	13.75 @ 14.00
Gray Forge.....	13.25 @ 13.50
Southern Charcoal, No. 1 Foundry.....	17.00 @ 17.50
Southern Charcoal, No. 2 Foundry.....	16.50 @ 16.75
Missouri Charcoal, No. 1 Foundry.....	15.50 @ 16.00
Missouri Charcoal, No. 2 Foundry.....	15.00 @ 15.50
Ohio Softeners.....	17.75 @ 18.75

Bar Iron.—A fairly active market can be noted at full prices. The outlook is considered very encouraging, and mills are not disposed to shade prices to secure orders. We quote as follows: Car lots from mill are quoted 1.72½¢ @ 1.77½¢; small lots from store at 1.85¢ @ 1.90¢, according to quantity.

Barb Wire.—Mills are comfortably filled with orders, and are anticipating a heavy trade at the reduced prices. We quote as follows: Painted, 2 60¢; Galvanized, 3.20¢; terms, 60 days or 3% discount for cash in ten days.

Wire Nails.—No change to note. Prices are weak, and those quoted herewith could possibly be shaded on desirable orders. We quote carload lots \$2.05; small lots from store, \$2.20.

(By Telegraph.)

Pig Lead.—Sales during the past week have been limited to small quantities for delivery during the present month. Prices are less firm than they were one week since, and sellers to-day ask 4.32½¢, with but few bids above 4.30¢. Spelter is not as firmly held as it was when our last report was written. Sales have been made at 4.70¢, and buyers do not appear willing to pay more. There is no speculative demand whatever, and buyers who are consumers order only what they absolutely require, and cannot be induced to purchase for future delivery.

W. J. Totten has been appointed sales agent for the Southwest, in charge of the St. Louis office of Carnegie, Phipps & Co., Limited, vice A. W. Dreves, resigned.

Mr. Totten will also represent Carnegie, Bros. & Co., Limited, in the sale of "Edgar Thomson" Rails and "Duquesne" Billets.

Detroit.

WILLIAM F. JARVIS & Co., Detroit, Mich., under date October 12, 1891, say: While the market has shown continued activity and considerable firmness there are still a number of weak spots, the majority of Southern furnaces holding firm as to prices and refuse to grant deliveries beyond January 1 unless at an advance. Notwithstanding their many protestations as to their firmness, yet there are a few sellers who, when the order is for a round lot and the customer a good one, do not hesitate to make almost any delivery requested, and at present prices. Ohio Irons are again coming into this market in larger quantities, and at prices nearer to that of Southern. Large inquiry is still being received for Lake Superior Charcoal, and the quantity sold is larger than at any time for several weeks past. There does not appear to be any speculative buying, as all sales are to consumers who are covering contracts now on their books. Prospects at present are good, and the general feeling among producers is one of hopefulness, and better prices are looked for at no distant day. With the demand good and prices remaining the same we repeat quotations as follows:

Lake Superior Charcoal, all numbers.....	\$18.00 @ \$18.50
Lake Superior Coke, Bessemer.....	17.75 @ 18.50
Lake Superior Coke Foundry, all ore.....	17.50 @ 18.00
Ohio Blackband (40 per cent.).....	18.00 @ 18.50
Southern No. 1.....	16.25 @ 16.50
Southern Gray Forge.....	14.00 @ 14.50
Jackson County (Ohio) Silvery.....	18.25 @ 18.75

Coal Market.

The Anthracite trade has changed for the better during the week only as the effect of cooler weather, which gives more firmness on account of the domestic demand. Circulars, as known for some time past, have "gone to the winds." As expressed in laconic terms not long ago by a leading operator, "May is the longest month this year that was ever known," and, as a fact, May is hardly over yet. It was the intention of operators and agents to cancel on September 15 all previous orders not then filled, which was not done, and consequently Coal is being delivered at the prices of July, and even of June; deliveries at May prices are exceptional. After all, an enormous amount of Coal has gone out of first hands this season, and it is a wonder in the trade how so much can have been absorbed. Quotations later than the September circular have no significance. In the Lehigh trade business is only fair. Lump is \$4.50; Broken, \$3.75 @ \$4.05, and Egg, \$4 @ \$4.15, according to brand. Lehigh Broken and Egg always command a higher price than Free Burning; other sizes vary but little. Free Burning Pea is \$2.25 @ \$2.50, alongside; Buckwheat, \$1.75 @ \$2. Steam Coals are dull. The colliery price of Coal, on which the miners' wages are based, are 6¢ higher for October than for September.

The East and West have taken advantage of cheap freights, which were never before so low, and shipments have been heavy in consequence.

Bituminous coal is firmer at Association prices, and transient orders—i. e., orders other than the regular contracts—are more frequent. But there is no boom. The week's production of anthracite was 863,000 tons; total for the year, 28,688,793 tons, an increase over last year of 2,772,208 tons. The Pennsylvania Railroad coal tonnage for the week was 255,848 tons

and coke 99,737 tons. The increase in coal shipments this year over that road is 1,198,103 tons in excess of last year, but there is a decrease in coke shipments of 943,745 tons.

Cumberland reports for the week 76,000 tons; Clearfield, 65,000 tons; Beech Creek and C. and O., each 67,000 tons; Pocahontas, 49,000 tons.

Sixty of the principal railroad Coal operators of the Pittsburgh district have signed an agreement "to hold out for three years, if necessary," against the miners' proposed advance of 13¢ per ton, and a long struggle is in prospect.

The Lehigh Valley, by its free entry into Jersey City, is assured of independent facilities for getting Coal to the lakes.

The Vanderbilts have acquired mining privileges which render necessary certain important extensions of the Beech Creek Road. In a short time that road will be extended south from its present terminus at Gazzan, Pa., to the Clearfield Coal district. Subsequently other short lines will diverge into various sections of the Coal fields.

Financial.

The general drift of events during the week strengthens the business situation. The Government crop report tends to confirm the previous estimates of enormous crops, while the exports of merchandise to Europe and the continued heavy imports of gold are full of encouragement, railroad earnings are on the increase, with prospects of rapid gains after the close of navigation, and money is remarkably easy for this season of the year. The Government report places the yield of wheat at 15 bushels per acre, equal to a yield of 588,000,000 bushels; corn condition at 92.5, which is understood to mean a crop of about 1,900,000,000 bushels; oats at 29.3 bushels per acre, just 9½ bushels more than last year, and equaling a final crop of about 750,000,000 bushels.

A sensation was occasioned by the summary ejection from office of Mr. Hoey, president of the Adams Express Company, and the election of Henry Sanford of Bridgeport as successor. Vice-President Spooner resigned. The directors charge malfeasance, some \$700,000 of profits having disappeared at the time of the absorption of Eastern companies in 1882. The matter appears to have slumbered until a recent date. He had been 40 years in the service.

The money question is no longer a source of anxiety, the flow of gold from Europe more than offsetting shipments to the interior. About \$3,500,000 have been received during the week, and nearly as much more is known to be on the way, so that our local banks will lend more freely than if there were doubts respecting future supplies. In regard to prospects several leading bankers agree in the belief that something like \$50,000,000 of the \$75,000,000 shipped since last spring will be returned. On the other hand, it must be observed that the purchase of American securities on foreign account has fallen off as well as the exports of cotton, at the same time that imports of merchandise are remarkably large. In the month of September there were brought to this port \$39,385,181 of merchandise, against \$48,876,281 for the corresponding month of last year, when goods had been ordered for the purpose of antedating the new tariff. Exclusive of specie the entries have been larger than for the same month of any former year, except the last and the year 1882. Exports, however, show a still larger increase, the gains being upward of \$8,000,000. Exclusive of specie the total is \$37,949,351, the largest for September known in the history of the port.

The stock market has been dull and generally lower. The most important influence in the market was the news that the Governors of the Bank of England had decided to continue the minimum rate of discount at 3%. This decision was thought to have connection with the offering of the new Russian loan, for which subscriptions will be received in London, Paris and Berlin until the 20th inst. It was explained that there were good reasons for postponing the meeting of the Advisory Board of the Western Traffic Association, and that there would be an adjourned meeting held later in the month. The favorable bank statement on Saturday had no stimulating influence. A Washington special says: "It is not true that this Government has concluded a convention with Germany by which our cereals will be admitted into that country free of duty in consideration of the free admission of German sugar after January 1. Negotiations looking to some concession by Germany are now pending, but are not completed."

United States bonds were quoted as follows:

U. S. 4½s, 1891, extended.....	100
U. S. 4s, 1897, registered.....	116¾
U. S. 4s, 1897, coupon.....	116¾
U. S. currency.....	111

Foreign exchange was dull, with nominal rates at \$4.80 @ 84 84.

Money on call was in fairly good supply. Time loans were in good demand, and lenders were more liberal in their offerings. On ordinary collateral the quotation was 6% bid for all dates. Commercial paper was dull. The city banks were out of the market as buyers. The mercantile classes seemed to be easier than some months ago.

The bank statement reflects the large gold imports of the week. The increase in specie holdings is \$5,918,000, and the increase in surplus reserve \$3,536,000. The surplus is now \$6,639,000, as against \$3,155,000 one year ago and a deficit in 1889. Respecting stagnation in the bond market a financial writer says: "It is undeniable that the demand for railway mortgages is not such as to encourage the offering of new loans. Otherwise we would not hear of so much stock being sold at a discount to meet expenditures for which bonds might more properly be issued. The only success in the way of floating bonds was that recently attained by President Kimball, of the Norfolk and Western, in London. But it seems as though some little improvement were being worked in the bond market, for if new issues are not readily marketable there is at least activity in the old. During the month of September \$55,000,000 of bonds (par value) were traded in at our Exchange against \$19,000,000 or \$20,000,000 in 1890. In New York, Boston and Philadelphia last week transactions in bonds were double what they were a year ago."

The merchandise markets are conservative, particularly grain and breadstuffs. Trade is apparently sound financially, and easy money is anticipated after the crops have been moved. Wheat continues firm but is less active, partly on account of accumulated stocks,—8,821,000 bushels in the Northwest and 8,300,000 in Atlantic ports, while Liverpool cables are steady at a decline. Ocean freights are very firm and still tending upward. The offerings of cotton, flour and provisions are liberal. Grain steamers were in demand at 4/1½ from a range of ports. Spot cotton was reduced ¼¢ on heavy receipts. Provisions weak on larger receipts in the West than at this time a year ago. Trading in wool, tobacco, &c., slow. Exports of merchandise from this port for this week, \$8,347,000; Imports, \$9,567,000.

The programme of the annual convention of the American Bankers' Association, to be held at New Orleans on November

11 and 12, will include several papers by prominent New York bankers and a paper by Professor Arthur T. Hadley of Yale College upon recent railroad legislation and its effect upon the finances of the United States.

New York.

Office of *The Iron Age*, 96-102 Reade street, New York, October 14, 1891.

American Pig.—Sellers in this section report that while an effort is being made to obtain full prices, occasional weak spots do appear, so that in some instances buyers succeed in covering requirements for the near future at prices close to the lowest made. Southern furnaces are stiffening. During the past week there have been sales in the West of large lots, including one block of 10,000 tons, another of 9000 tons and a third of 7500 tons, for delivery during the early part of next year, on the basis of \$10, Birmingham, for Gray Forge and \$10.25 for No. 3 Foundry, figures which show a clear advance of 25¢ a ton. We understand that the Tennessee Coal and Iron Company had on their books orders aggregating 80,000 tons on October 1, and have since then added nearly 30,000 tons more. We note also a sale in the Lehigh Valley of 5000 tons of Gray Forge to a local mill at \$13.75. We quote Northern brands, \$16.75 @ \$18 for No. 1; \$16 @ \$16.50 for No. 2, and \$14 @ \$14.50 for Gray Forge. Southern Iron sells at \$16.25 @ \$17 for No. 1; \$15.50 @ \$16 for No. 2; \$14.50 @ \$14.75 for No. 3 Foundry, and \$14.25 @ \$14.50 for Gray Forge.

Spiegeleisen and Ferromanganese.—There has been no business whatever in Spiegeleisen, which we continue to quote nominally \$27.50 @ \$28 for German and English. Foreign Manganese has been sold only in a jobbing way, with tide-water price remaining nominally \$64.50.

Billets and Rods.—From the West come reports that the mills, while willing to book orders for domestic Billets at \$25, show no disposition to shade \$25.50 for delivery after the first of the year. Foreign Billets may nominally be quoted \$31 @ \$31.50. In domestic Rods a tidewater works has placed an order for upward of 1000 tons, and has also taken a quantity of No. 9. We continue to quote \$37.50 @ \$38, at tidewater.

Manufactured Iron and Steel.—Bids for the McComb's Dam Bridge have been opened, the lowest bidders being the Union Bridge Company. As yet, however, the contract has not been closed. During the week the Rothschild Building, calling for about 2000 tons of Structural material, was taken, as was also another structure requiring about 1000 tons. Local mills report only a moderate amount of business. The fact that about 13,000 tons has been placed in Philadelphia for the Reading Company indicates that some of the mills are getting into good shape for future orders. We note an increased disposition to introduce the foreign Beams into this market, a number of firms having the matter under consideration. German Steel Beams, American sections, are offered at 2.60¢, while other sections may be purchased as low as 2.35¢. We continue to quote: Angles, 1.90¢ @ 2.10¢; Sheared Plates, 1.95¢ @ 2.25¢; Tees, 2.45¢ @ 2.75¢, and Beams and Channels, 3.1¢, on dock. Steel Plates are 1.95¢ @ 2.15¢ for Tank; 2.20¢ @ 2.30¢ for Shell; 2.45¢ @ 2.65¢ for Flange; 2.65¢ @ 2.75¢ for Marine, and 3¢ @ 3.25¢ for Fire Box, on dock. Bars are 1.7¢ @ 1.9¢, on dock. Scrap Axles are quotable at 2.15¢ @ 2.20¢, delivered. Steel Axles, 2.15¢ @ 2.25¢, and Links and Pins, 2.15¢ @ 2.20¢.

Steel Rails.—Some of the mills are fairly off for orders running on single turn,

but others have very little on their books. During the week only small lots have been placed, including one of about 1300 tons for the elevated road, and a like amount for a Mexican road, prompt delivery. The price continues steady at \$30.80, tide-water. Some sellers note that what inquiries are received are coupled with a demand for an option on further amounts.

Track Material.—We quote 2.15¢ @ 2.25¢ for Spikes, 1.75¢ @ 1.90¢ for Fish Plates, and 2.80¢ @ 3¢ for Bolts, delivered.

Merchant Steel.—We quote Hot-Rolled Shafting 2.05¢ @ 2.10¢; Machinery, 2.15¢ @ 2.25¢; Tire, 2.20¢ @ 2.25¢, and Toe Calk, 2.25¢ @ 2.30¢, delivered.

Old Material.—Free offerings of Old Material continue, but there has been very little business done.

Metal Market.

Following the offering of Lake Superior Ingot at 12.35¢, noted in last week's review, somewhat of a fright seized certain speculative holders, who dropped several hundred thousand pounds of their holdings at 12.15¢, the greater portion of which went to consumers. The fright was caused by the rumors of resumption of work at the Anaconda Mines and others to the effect that liquidation of the old French interest properties was under way. Neither rumor has been substantiated, but Lake Copper is on sale at 12¼¢, regular, in good-sized lots, while small parcels could be secured at 12.15¢, net cash, all of which would go to show that the situation is not assuring in the opinion of all holders. During the past few days several blocks have been placed at 12¼¢ for November and December delivery. Casting Copper is dull, with 11¼¢ named as the nominal prices. Apropos of the reopening of the Anaconda Mine, it is stated in some quarters that nothing in that direction is likely to be done unless some arrangement is made between the Anaconda, the Boston and Montana and the Butte and Boston companies, whereby production will be reduced 20%, or so as to keep market prices at a profitable point. In the same quarter it was also stated that Mr. Haggin is disinclined to resume work under present conditions, but there is a growing belief that Anaconda stories will last for some time and be made a tool for speculative manipulation of the market. Several lots of old Copper have been sold here at 10¼¢ and Composition at 10¢, some of which is understood to have been for export.

Pig Tin.—Managing the Pig Tin market seems to be a difficult job for those engaged in it, and forming a working idea of what the leaders are really up to is something that evidently mystifies the rank and file. At intervals when the surface appearances suggest a break, the market is given a little turn upward, and no sooner does sentiment turn than reaction takes place. The pendulations are not great, yet sufficient to keep the outsider in a state of uncertainty and cause consumers to buy cautiously. One of the most noteworthy features during the past week has been the selling of 10-ton lots to the out-of-town trade on regular terms, and at only a small advance over local net cash prices. For example, out-of-town buyers were accommodated at 20.10¢ @ 20.15¢ on Monday and Tuesday, while 20.10, net cash, was paid here on the latter day. Small quantities were dealt out at prices relatively as low. The inference is that the large holders are gradually working off their stocks and at the same time successfully contending against the "bear" speculators. At the close the market was firm, with 10-ton lots quoted 20.10¢ @ 20.15¢ and jobbing quantities about 20¼¢ @ 20.30¢, ex store.

Pig Lead.—The demand has been very slow again, and the inaction of buyers since the beginning of the month is apparently disheartening some smelters and other holders who looked for a very different condition of affairs. In any event, prices sagged gradually until 4.45¢ was reached, without any considerable quantity of Lead changing hands or greater interest manifested by consumers. A 50-ton trade at 4.40¢ to make official price for Bullion was recorded.

Spelter.—The situation in the market for this metal is unchanged. Consumers have purchased in a moderate way only, and experienced no difficulty in obtaining prime Western brands at 5.05¢ in carload lots. Not over 5¢ could be obtained for inferior brands.

Antimony.—No further advance in prices has taken place, but the market is very firm, although quiet. Hallett's is quoted at 10½¢, LX at 11½¢ @ 11½¢, L. J. & C. at 11¢ @ 11½¢ and Cookson's at 13¢ @ 13½¢, in wholesale quantities.

Tin Plate.—Penlan grade Cokes and ordinary Bessemer have been offered somewhat freely on the spot and sold at lower prices. Other Coke finish Plates are in good position, however, and firmly held. Bright Charcoals are also well under control and firmly held. The assortment of Terns is poor, and prices for nearly all varieties are higher. Business has been moderate, and the demand is spiritless at the present time. We quote: Coke Tins—Penlan grade, IC, 14 x 20, \$5.30; J. B. grade, do., \$5.45; Bessemer do., \$5.35; Siemens Steel, \$5.50. Stamping Plates—Bessemer Steel, Coke finish, IC basis, \$5.75; Siemens Steel, IC basis, \$5.85 @ \$6; IX basis, \$6.85 @ \$7. IC Charcoals—Melyn grade, \$6.50; for each additional X add \$1.50; Allaway grade, \$5.85; Grange grade, \$5.90 @ \$5.95; for each additional X add \$1. Charcoal Terns—Worcester, 14 x 20, \$5.70; do., 20 x 28, scarce; M. F., 14 x 20, \$7.50; do., 20 x 28, \$15.25; Dean, 14 x 20, scarce; do., 20 x 28, \$10.70; D. R. D. grade, 14 x 20, \$5.25; do., 20 x 28, \$10.12½; Mansel, 14 x 20, \$5.35; do., 20 x 28, \$10.40; Alyn, 14 x 20, \$5.40; do., 20 x 28, \$10.45; Dyffryn, 14 x 20, scarce; do., 20 x 28, \$11.25. Wasters—S. T. P. grade, 14 x 20, \$4.90; do., 20 x 28, \$9.85; Abercarne grade, 14 x 20, \$4.90; do., 20 x 28, \$9.70.

Some time since we referred to the statement made by James Lewis & Son of Liverpool in regard to the quality of Tamarack, Osceola and other Lake Copper. In justice to all we quote the following from their last market report: "Exception has been taken by the agents of the companies to the remarks in our report of August 17 with regard to the irregular quality of some of the Lake Superior Copper. We are informed by large American consumers that the quality of this Copper is both regular and reliable, and that the Tamarack and Osceola brands are equal to the best brands of Lake. We are therefore glad to record their experience in contradiction of our previous advices."

New York Metal Exchange.

The following sales are reported :

THURSDAY, October 8.	
25 tons Tin, October.....	20.10¢
50,000 lb Lake Copper, spot.....	12.15¢
FRIDAY, October 9.	
30 tons Tin, March.....	30.30¢
TUESDAY, October 13.	
10 tons Tin, spot.....	20.10¢

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, October 14, 1891.

The movement in prices of Pig Iron warrants has been light, and the market is without important new feature. There have been more buying orders about, but few lots changed hands, as buyers' limits were too low. Board of Trade returns for the month were somewhat disappointing. Exports shown to be only 87,000 tons, against 97,000 tons in September last year. Stocks in warrant stores have fallen off slightly. The totals are now 499,000 tons Scotch and 150,000 tons Cleveland. Latest sales of warrants were at 47/ for Scotch, 40/1½ for Cleveland and 49/1½ for Hematite.

Pig Tin market has been firm during the greater portion of the week, with more business doing toward the close, chiefly for consumptive account. Outside speculation is light.

Early in the week the Copper market was depressed by rumors of reopening of the Anaconda mines and reported sale of the Société des Métaux works and stock. Later on prices improved under the influence of purchases to cover "short" accounts and better buying on the part of consumers. There is still a feverish feeling, due to uncertainties regarding Anaconda and the French interests.

In Tin Plate there has been more business. Some good Russian and Frisco lines were booked. American buyers seem more inclined to business. Exports last month, 26,000 tons, of which 11,000 tons to the United States, against 35,000 tons and 25,000 tons respectively in September, 1890. Stocks at shipping ports show large increase.

Holders of Old Iron Rails and Scrap Iron are more hopeful, owing to improvement in the demand recently, and prices show an upward tendency.

Scotch Pig Iron.—The demand for makers' Iron shows little improvement and prices are without radical change:

No. 1 Coltness, f.o.b. Glasgow.....	58/6
No. 1 Summerlee, " ".....	57/
No. 1 Gartsherrie, " ".....	57/
No. 1 Langloan, " ".....	58/
No. 1 Carnbroe, " ".....	48/6
No. 1 Shotts, " ".....	59/
No. 1 Glengarnock, " Ardrossan.....	57/
No. 1 Dalmeilington, " ".....	51/6
No. 1 Eglinton, " ".....	51/
Steamer freights, Glasgow to New York, 2/; Liverpool to New York, 10/.	

Cleveland Pig.—Business is of fair volume and the market is steady at 40/3 for No. 3 Middlesborough, f.o.b.

Bessemer Pig.—There is little change in the character of demand, but makers' prices are steady at 50/ @ 50/6 for West Coast brands, Nos. 1, 2 and 3, f.o.b. shipping port.

Spiegeleisen.—Business is quiet, but makers hold at former prices. English 20 % quoted at 95/, f.o.b. shipping port.

Steel Rails.—No further change in prices, but the market rather weak and quiet. Heavy sections quoted £4 and light sections £4. 10/ @ £5, f.o.b. at N. W. England shipping point.

Steel Blooms.—The market is quiet, and prices are without important change. Makers quote £4. 5/ for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—Moderate sales are making, and prices remain as before. Bessemer, 2½ x 2½ inches, quoted at £4. 7/6, f.o.b. at N. W. England shipping point.

Steel Slabs.—Transactions still light and makers' prices unchanged. Bessemer quoted at £4. 7/6, f.o.b. at N. W. England shipping point.

Old Iron Rails.—Sellers very firm in their views. Demand has improved. Tees quoted at £3 @ £3. 2/6 and Double Heads £3. 2/6 @ £3. 5/, f.o.b.

Scrap Iron.—There is a fair demand, and prices are firm. Heavy Wrought Iron quoted at £2. 10/ @ £2. 12/6, f.o.b.

Crop Ends.—Dealings still on a moderate scale and at former prices. Bessemer quoted at £2. 12/6 @ £2. 15/, f.o.b.

Tin Plate.—No radical change in values, but demand rather better. We quote, f.o.b. Liverpool:

IC Charcoal, Alloway grade.....	15/6 @ 16/
IC Bessemer Steel, Coke finish.....	13/9 @
IC Siemens " ".....	14/ @
IC Coke, R. V. grade.....	13/6 @
Charcoal Terns, Dean grade.....	13/3 @ 13/6

Manufactured Iron.—Business is of fair volume and prices generally steady. We quote, f.o.b. Liverpool:

	£ s. d.	£ s. d.
Staff. Marked Bars.....	6 15 0 @	8 10 0
" Common ".....	6 15 0 @	6 17 6
Staff. Bl'k Sheet, singles.....	6 7 0 @	7 10 0
Welsh Bars (f.o.b. Wales).....	5 10 0 @	5 12 6

Pig Tin.—The market to-day was quite firm, with Straits quoted at £91. 17/6, spot, and £92. 7/6 @ £92. 10/ for three months' futures.

Copper.—Demand moderate at the close, but market steady. Merchant Bars quoted at £50. 2/6, spot, and £50. 12/6 @ £50. 15/, three months' futures. Best selected, £54. 10/.

Lead.—There has been little doing and the market is easy. We quote at £12 for Soft Spanish.

Spelter.—Demand fair and prices steady at £23. 12/6 @ £23. 15/ for ordinary Silesian.

Imports.

Hardware, Machinery, &c.

Baker, Hermann & Co., Arms, cs., 40
Curley, J. & Bro., Cutlery, cs., 2
Clark Mile End Co., Machinery, cs., 6
Degrauw, Aymar & Co., Anchors, 3
Downing, R. F. & Co., Arms, cs., 12
Edison Electric Co., Machinery, pgs., 6
Field, Alfred & Co., Arms, cs., 10
Folsom Arms Company, Arms, cs., 14
Graef Cutlery Company, Cutlery, cs., 6
Hampton, Jr., J. W. & Co., Gun Barrels, cs., 37
Hartley & Graham, Guns, cs., 11
Hoe, R. & Co., Mach'y, ese., 1
Knauth, Nachod & Co., Ironware, cs., 6; Machinery, cs., 29
Lau, J. H. & Co., Arms, cs., 6
Schoverling, Daly & Gales, Arms, cs., 35
Van Sickle, J. T., Machinery, box, 1
Van den Toorn, W. H., Guns, cs., 30
Werlemann, H., Arms, cs., 105
Wiebusch & Hilger, Arms, cs., 30
Wyman, Chas. & Co., Arms, cs., 3

The new Mexican tariff will go into effect on November 1, and the Custom House officials at Neuva Laredo and Piedras Negras, the two principal gate cities on the Texas boundary, are being deluged with business on account of merchants rushing goods into Mexico from the United States so as to avoid the high duties.

HARDWARE.

Condition of Trade.

BUSINESS CONTINUES to be somewhat disappointing, both in volume and in its general tone. While manufacturers and jobbers concede that a fair business is in progress, it evidently has not yet come up to the expectations which were formed in view of the large crops and the confidently anticipated prosperity. Travelers report the trade through the country as generally good, but refer to the retailers as pursuing a very conservative course in regard to the placing of orders, refusing to purchase goods in quantities more than sufficient to meet their early requirements. They apparently lack confidence in any early strengthening in prices and are purchasing only such goods as they need to keep their stocks comfortably replenished. In the matter of prices the market shows as yet no improvement, some of the staple goods which have been low and irregular for some time continuing at about former prices, and in some cases settling a little. Collections are, however, easier, and much less complaint is made in regard to the matter. Export trade is also in fair condition, having shown considerable improvement within the past month or two.

Chicago.

(By Telegraph.)

Shelf Hardware jobbers here agree in the opinion that they have not yet experienced the genuine fall trade. The demand has been of a spasmodic character for some weeks, occasionally rising to a fair degree of activity and then relapsing into a quiet condition. The general average has been about up to the trade of the corresponding period of last year, but much more than this was expected. Compared with last week the volume of business shows an increase, which has been quite marked with some houses. General activity now seems to depend on the early advent of cold weather, for which the trade are rather impatiently looking. Collections are good, although some complaint is heard of city merchants whose trade is doubtless affected by the continuance of mild weather. The demand for heavy Hardware seems to be affected by nothing, but keeps up to its usual large volume.

St. Louis.

(By Telegraph.)

Jobbers of Hardware report continued improvement. The cooler weather which set in about ten days since has had a benefiting effect on trade and a large business is the result. The demand for Fire Arms of all descriptions and ammunition is very

heavy. Copper and copper goods are moving freely, but prices fail to improve. Shelf Hardware is called for regularly and a good supply of winter goods is generally included in orders received from the Northwest. Trade in the Far West is particularly heavy, as St. Louis is in a position to handle this trade more profitably to the dealer than any other point. Barb Wire and Wire Nails are dull, as are also Cut Nails. Building materials are not called for very regularly. Prices are well maintained and remain practically unchanged.

Baltimore.

CARLIN & FULTON.—With the month of October the active demand for goods from the South is almost ended, and we notice the absence from our streets of the many buyers who take occasion to visit our Northern cities during the early fall season. This lull in business from that section is followed by the improvement in our nearer markets, and just now trade is quite active with orders from the grain growing sections.

It is to be noticed, however, that in nearly all cases buyers are pursuing a most cautious policy, confining their purchases to the early requirements of their trade, relying upon the ability to replace stocks quickly if needed, and paying but little attention to any prophecies of future advances.

A general survey of the situation leads us to believe that stocks of merchandise throughout the entire country are lower than for many years and that the indebtedness of the average merchant is correspondingly small, and that at a not far distant date the necessity for replenishing stocks will be so great that, feeling the benefits of the immense crops of the present year, there will be a great revival of business and a response by the manufacturers in the shape of advanced prices, which are now undoubtedly lower than are justified by both the cost of production and the increasing demand for goods.

Philadelphia.

SUPPLER HARDWARE COMPANY.—We are able to report a healthy condition in the movement of Hardware, together with an increase in the volume of trade, as the condition in this city since our former letter. While there is no speculative feeling on the part of either the retail merchant, manufacturer or jobber, there is a decided healthy feeling in the minds and actions of all. Excitability as a nation is a characteristic of ourselves, and uneasiness prevails in all branches of trade at the slightest indication on the horizon of a depression in trade. Combinations, or at least mutual understandings, as they are now called, between the manufacturers, as to the prices at which they will offer season's goods to the trade, will usually be held in check for a limited time, providing the volume of trade is sufficient to enable each to dispose of his productions, but with

any indications of a depression of trade (causes which, fortunately, are not likely to exist within the next year) the manufacturers often rush like a flock of sheep, heedlessly blind as to the cost of goods or the effect their action will have upon the market. In this suicidal rush contracts are made regardless of the cost of goods, and not infrequently will continue until the capital is impaired, when, perhaps, they may find the outlook and prospect brighter, and combinations, trusts or understandings are again in order, and are signed, sealed and filed away. Then, oh, then you would scarcely recognize your former seductive friends; they may even cease to have a commercial tourist. They will, of course, acknowledge receipt of letters, quote prices agreed upon; but experience duplicated and quadrupled has been wasted upon them, and they now imagine that their bed hereafter will be one of clover. When such is the case the margin of profit offered to the jobber for his large purchases, as an inducement to take goods out of season, is the least of their concern; indeed, in some cases it is scarcely considered sufficiently important to write direct to the buyers, or to their best trade the prices adopted, but they do send their circulars direct to the weekly issue of trade reports, which they think should be sufficient to convey the intelligence to their customers, and frequently these printed circular notices are sent out broadcast—prices by the dozen or gross, as the case may be; Nails by the keg, carload or 10 carloads; Barb Wire by the 100 pounds, by the ton, carload or 100 carloads, for the information of all alike who can read. So much time is saved by distributing information in this way.

Is this American excitability a lack of business training or supreme selfishness? This is a question which it is difficult to answer. Whatever it is the ball will continue to roll, and the point once at the bottom as the ball revolves gradually reaches the top. Then the large buyer has again many friends, who suddenly appear before him. We now appear to be at the bottom in almost all goods of the Hardware line. Uneasiness has already prevailed in the stock market. Prices have advanced, when a sudden check, which was thought necessary and wholesome by some of the few who can control matters of that kind, prevented the American excitability from rushing like a flock of sheep, buying stocks wherever they could pick them up. This has always been the first indication of a likely advance in prices, especially in the Hardware line, for goods which are being sold at cost or under cost. The country was never so rich as now in the wealth of her harvests. Those farmers who, in an unguarded moment, at the urgent solicitations of some mortgage company, mortgaged their farms, have thus providentially

escaped losing their entire farms, and now find themselves in a position to pay off their mortgages and have ready money on hand. No other country in the world has ever been blessed as largely as our farmers have this year. Fortunately for them and our country as well, the shortage of crops in foreign countries will cause a demand for the entire surplus here, and there will thus be no necessity for carrying over their products for another year for lack of demand.

Reports reach us that the unusually warm weather which has prevailed until within the last few days has retarded the distribution of goods. The farmers, as a rule, have not sufficient help for securing their crops, which alone would prevent their absentsing themselves from their farms. This may even continue for some weeks to come. Complaints reach us from the local Hardware merchants that the anticipated improvement in trade, owing to the unprecedented crops, has not been fully realized. This is quite natural, and the expanding volume of trade is not likely to burst like a thunderbolt upon either the retailer, jobber or manufacturer, but evidence of its advance is already shown by the increase of consumption of Iron and export shipments bringing gold to our country, and the signs of the times are prosperous.

Omaha.

LEE - CLARKE - ANDRESEN HARDWARE COMPANY.—The assurance of an abundant crop of all kinds of farm products and the prevailing high prices for the same is having a beneficial effect upon every line of business. The inclination among the farmers to hold back the marketing of their crops may temporarily defer the boom in trade which would be sure to follow the sudden marketing of vast quantities of farm products, but there is enough being sold to stimulate trade all along the line. Notwithstanding the exceptionally favorable business conditions that now exist, a steady, conservative feeling devoid of any speculative tendency extends throughout the entire mercantile community. At the present time no attempt is noticeable to take special advantage of the demand in the matter of advancing values. Prices are held firmly on all sides, while some goods in the Hardware line which now rule abnormally low may reasonably be expected to improve in price before many weeks.

Louisville.

W. B. BELKNAP & Co.—The volume of business for September, while it was fair and kept the manufacturers and dealers moderately busy, was hardly up to expectations. The fact is that the consumers have not yet realized on the crops; the current of gold has barely set toward New York and, like the fashions, it will be months before it gets into the interior; not till then can we expect to realize any very great improvement. There is a little firmer feeling in Sheets, Plates, and Structural Iron, while Bar Iron, Hoops and Bands are about stationary. Cut Nail manufacturers are indifferent about orders at the present low prices, and are endeavoring to obtain

a small advance. Wire, Wire Nails and goods of that class have felt the effect of the reduction in the price of Barb Wire and can hardly be called strong. The financial condition is much improved, money is comparatively abundant, though discount rates in this market are well maintained.

Portland, Ore.

FOSTER & ROBERTSON.—Aside from the very decided improvement in collections, there is little change since our last letter. Trade is moving along in an easy, moderate manner, orders being reasonably plenty but modest in size. So far this month there is little of the rush that generally characterizes business at this season of the year, frequently requiring night work to keep the floors clear. The fact that farmers are extremely busy as yet moving the present and preparing for the next year's crop doubtless has much to do with this moderate state of trade.

Cleveland.

THE W. BINGHAM COMPANY.—There is no doubt but that the unseasonable warm weather that has prevailed over the country during the past few weeks has had a depressing effect upon trade; consequently the month of September will not "pan out" as richly as previous indications would have warranted. The farmer, as a rule, will not go to town especially to buy Hardware, but when cold weather comes on, his wife informs him that she and the children need warm clothing, some heavy shoes, or possibly their old stove has given out and they will have to have a new one; he will then go to town, and while she is doing her shopping will attend to his wants in the Hardware line. While the weather is warm they do not think of these things, and he stays at home to attend to his farm work. We have noticed that almost invariably a warm fall means a slow trade. The demand for fall goods, although very good, is not what it would be if the weather were more seasonable. Prices remain without much change, with the exception of Barbed Wire. The change of price made by the Columbia Patent Company, as noted by you in your issue of the 1st, was totally unlooked for, and to our mind wholly uncalled for, and will gain for them more enemies than friends among the large trade. Nails are in good demand at \$2 for Wire and \$1.65 for Cut from stock. Collections are very fair.

New Orleans.

A. BALDWIN & Co.—Since our last report slightly improved feeling in the Hardware line is being felt in this section. A good, fair jobbing trade is being done, although it does not show the same activity attending a boom. Shelf Hardware is moving freely. Most of the merchants are getting ready for their fall trade, which, we think, will average about the same as the past season, with a tendency, if any, toward an improvement. Crops are being moved and collections show an improvement.

Notes on Prices.

Cut Nails.—The Cut Nail market is in substantially the same condition as at our last report, quotations being on the basis of \$1.50 to \$1.55 for Iron or Steel Nails, in carload lots at mill, with the usual 25 or 30 cent average. Most of the mills, however, have ample stocks and are willing to shade these prices on desirable orders. Quotations in the West continue on the basis of \$1.55 to \$1.60 in carload lots at mill, with 25 cent average, these prices also being shaded in special cases. There is not much animation in the demand and some of the mills are not pressing sales, in view of the fact that existing prices are not sufficiently remunerative.

Chicago, by Telegraph.—Cut Steel Nails are in rather better shape than Wire Nails, but this is perhaps due to the fact that local makers have established prices on a level with which outside concerns cannot compete, thus securing a steady home demand. Prices are about \$1.65 to \$1.70 for 25 to 30 cent average. Small lots from stock sell at \$1.75 to \$1.80.

Wire Nails.—A steady trade of fair volume is doing in Wire Nails, but the demand is not equal to the capacity of the mills, some of which have accumulated stocks which they are desirous of disposing of. As a result of this condition, some Nails have been offered the past week at lower prices than have heretofore ruled, and the market is, perhaps, slightly weaker than it has been. For round lots at mill \$1.80 to \$1.85 is quoted, the lower of these figures being given in exceptional cases. Small lots from store are held at from \$2 to \$2.15, according to circumstances. Many of the large buyers have covered their wants for some time to come, but thus far there has not been any general confidence that there would be an early improvement in this line, although existing prices are regarded as exceedingly low. Negotiations between the manufacturers, with a view to reaching some understanding by which the demoralization which characterizes this line of goods might be checked, still continue, but without any definite result. The matter is receiving careful attention with a view to discovering some way by which the difficulties which encompass the matter may be surmounted.

Chicago, by Telegraph.—Trade is not so heavy from first hands and manufacturers' agents report but a light inquiry. They have now stocked the jobbers pretty thoroughly, and will have to wait until the retail trade becomes more active. Prices are unsettled in consequence of irregular offerings of Nails at low prices for prompt cash and immediate shipment. When a low seller accomplishes his purpose he immediately marks quotations up again, but the market is thus kept in a feverish condition, as another raid is looked for by some other manufacturer. The factory price in a regular way is equal to \$1.95, Chicago, but most Nails are being bought as above indicated. Small lots from stock are sold at \$2.05 to \$2.10.

Barb Wire.—Since our last report there has been no change in the aspect of the Barb Wire market, the new prices made by the Columbia Patent Company being generally accepted. There is some difference of opinion among the trade as to the necessity or wisdom of the reduction in prices, but it is understood that the reduction was made with a view to heading off some new competition. Prices are regularly maintained and a moderate business is doing.

Chicago, by Telegraph.—Barb Wire presents no new features. Jobbers quote \$2.65 for Painted.

Wrought-Iron Pipe.—The following revised discounts on Wrought-Iron Pipe were adopted by the association manufacturers at a recent meeting:

	Per cent.
1 1/4 inch and smaller Black Pipe	57 1/2
1 1/4 " " larger	67 1/2
1 1/4 " " smaller Galvanized Pipe	47 1/2
1 1/4 " " larger	55
1 1/4 " " smaller Tarred Pipe	57 1/2
1 1/4 " " larger	67 1/2
Well Casing, all sizes	55
Lap-Welded Charcoal Iron Boiler Tubes, 2 1/2 inches and smaller	55
Lap-Welded Charcoal Iron Boiler Tubes, 3 to 6 inches, inclusive	65
Lap-Welded Charcoal Iron Boiler Tubes, larger than 6 inches	65
Lap-Welded Steel Boiler Tubes	30

The market in this line is reported to be firm, and is characterized by more regularity than for some time past. The consolidation of some interests has had some influence in producing this improved condition. The volume of business is referred to as good.

Wringers.—The following is the price-list of the Colby Wringer Company, Montpelier, Vt. It is subject to a discount of 2 per cent. for cash:

The Premium Wringer.

Galvanized malleable iron frame, folding apron and automatic adjustment. Solid white rubber rolls vulcanized on the shafts.

Price per dozen.

No. 10 Rolls, 10 x 1 1/4 inches	\$25.00
No. 11 Rolls, 11 x 1 1/4 inches	28.00
No. 12 Rolls, 12 x 1 1/4 inches	31.00

Colby Improved Wringer.

Galvanized malleable iron frame, folding apron, which automatically adjusts and the pressure fastens the Wringer to the tub. Solid white rubber rolls vulcanized on the shafts.

Price per dozen.

No. 3 Rolls, 10 x 1 1/4 inches	\$36.00
No. 2 Rolls, 11 x 1 1/4 inches	42.00
No. 1 Rolls, 12 x 1 1/4 inches	48.00

In view of the tendency on the part of some manufacturers to sell more directly to retailers and not give the jobbers as wide a margin as formerly, we are advised by the company that their policy has been to allow jobbing houses liberal discounts beyond the quotations given above. They refer to their largely increased trade as showing that the jobbers appreciate this protection.

Glass.—Inquiries for Glass at the factories are increasing, according to reports received. There is no change in price, and the demand has not reached the point desired by the manufacturers. There seems to be a general feeling that the price fixed by the Columbus meeting was too low, and that the October meeting will correct the matter. The subject of over-production of Glass is beginning to receive attention, and to this cause low

prices are attributed. It is stated by a gentleman largely interested in the Glass trade, that if all the factories in the United States were to run full, they would about supply the American trade. It is a well-known fact that large quantities of foreign Glass are imported into the country, and finds a market here at a price which is at present above that of American Glass. Imported Glass remains firm, and trade is reported as satisfactory at 75 and 10 per cent. discount. Printed quotations are as follows: American Window Glass, in carloads, 80 and 10 and 5 per cent. discount; less than car lots, 80 and 5 per cent. discount; French Window Glass, 75 and 10 per cent. discount; American Plate is held at a discount of 50, 10 and 5 per cent., and Imported Plate at a discount of 60 per cent.

Tool Chests.—American Tool Company, 200 West Houston Company, New York, issue a discount sheet giving discounts on Tool Chests embraced in their catalogue August 1, 1883, as follows, terms 30 days net or 1 per cent. discount for cash in ten days:

	Discount per cent.
For Boys' Chests, Nos. 55 to 0 1/2, Gothic, inclusive	50
For Boys' Chests, Nos. 55 to 0 1/2, Empty, Gothic, inclusive	50
For Gentlemen's Chests, No. 13	50
For Youths' Chests, Nos. 2A, 1A to 4, inclusive	40
For Gentlemen's Chests, Nos. 4 1/2 to 6 1/2 inclusive	30
For Farmers', Planters', Railroads', Mines' and Carpenters' Chests, Nos. 7 to 14 inclusive	20
For Housekeepers' Chests, Nos. 550 to 750 inclusive	50
For Machinists' Chests, Empty, Nos. 250, 350 and 450	50
For Boys', Youths' and Gentlemen's Eureka Chests, Nos. 33 to 215 inclusive, and 20 to 25 inclusive	50
For Handy Chests, Nos. 1266 to 1269 inclusive (supplemental catalogue)	50
For Gentlemen's Chests, with Drawer, Nos. 450 and 460 (supplemental catalogue)	50

Hibbard, Spencer, Bartlett & Co.'s New Catalogue.

A NEW HARDWARE CATALOGUE has just been completed by Hibbard, Spencer, Bartlett & Co. of Chicago, which is claimed to be the largest ever issued, also to contain the most goods, and so far as we know the claims are justified. It comprises no less than 1438 pages, and a single copy weighs 16 1/2 pounds. The goods shown are illustrated and described in a comprehensive manner, but in the smallest possible space consistent with artistic bookmaking. Care has been taken to have goods of a similar kind shown on pages facing each other, to make them easy of comparison. The scope covered in the contents is well shown by the extent of the index, which covers 33 pages, of three columns each, closely printed, and numbering nearly 7000 separate items, many of which embrace several lines of goods which might be considered entitled to individual mention. This index measures 84 feet in length, single column. It has been arranged with consummate care to meet all possible requirements. To enable the eye to quickly catch an item sought, the first word in

which an alphabetical change is made is in every case set in heavy-faced type. There is also a marginal alphabet. Other features of note will be found in the index and appreciated by those who have occasion to use it frequently.

The catalogue contains an interesting frontispiece in a double view of the firm's shipping shed on Wabash avenue. One view shows the shed with the floor crowded with goods awaiting shipment on Saturday. The other shows the shed as it appears on Sunday, without a vestige of Saturday's bustle visible. On the title page appears a fine illustration of the firm's business block, which is an imposing structure, five stories high. The contents proper begin with Mechanics' Tools, which occupy up to page 236. A number of the Axes and Hatchets shown are printed in colors, the parti-colored labels being perfectly reproduced. Builders' and General Hardware come next, extending to page 614. The plan followed in illustrating Builders' Hardware is a double arrangement. It is often desirable to have a complete set of house trimmings together in order to study the whole effect, while on the other hand different styles of the same article need to be classed together for comparison and convenience in ordering, hence both ideas have been carried out in this catalogue. Bronze Metal and Electro-Bronzed goods form a subdivision of Builders' Hardware, extending from pages 189 to 265. Pages 615 to 635 are devoted to colored plates of House Furnishing Goods, in which the exact tints of the decorations are reproduced. These illustrations include such articles as Pearl Agate Tea and Coffee Pots and Enameled Ware. The complete display of House Furnishing Goods extends to page 810. Tinnery and Roofers' Stock and Tools follow next, occupying up to the 830th page.

This house has always been noted for its large and varied stock of Cutlery. The trade-mark adopted for goods specially made for the firm is "Our Very Best," and this device on Razors, Pocket Knives, &c., has established for itself a high reputation. The Cutlery department extends from page 831 to 957, and covers an almost infinite variety of patterns. The stock of Cutlery carried by the firm embraces about 2000 styles of Pocket Knives and a corresponding assortment of Table Knives, Shears, Scissors, Razors, &c. The catalogue, however, shows only the leading patterns. Silver-Plated Flat and Hollow Ware next occupy the space running up to page 1025. Guns, Pistols and Sporting Goods generally cover 239 pages, extending to page 1264. Lamps and Lamp Goods form another extensive department, running to page 1438 and completing the volume.

This catalogue is printed on very fine and unusually heavy paper for a book of its size. Four 20-ton carloads of paper were used in printing the edition, which is so large that the bindery will be employed two to three months in finishing the work. Three printing houses were engaged on it constantly from the time it

was begun, and 11 presses were used, so that the completion of the book would not be delayed unreasonably. The catalogue is a perfect specimen in every respect of artistic book work, but the binding is especially noteworthy. The book lies flat when open, but is remarkably strong. It is sewed with four cords, each laced into the cover. The best quality of red Russia leather is used for the back and corners, the sides are cloth, and the firm's name is stamped in pure gold. Two boards glued together form the sides. The edges of the leaves are colored red and are waxed and burnished. The entire work was done in Chicago. The compiler of the catalogue is F. F. Austin, who had previous experience in catalogue making, and therefore appreciated at the start the difficulties to be encountered, as well as the opportunities offered to achieve a marked success. He was aided in his task by the various department managers, who may well be proud of the part they took in getting up this magnificent volume.

Trade Items.

BUTTS & ORDWAY, 500 Atlantic avenue, Boston, have been appointed New England agents for Cleveland Axle Company's well-known Arrow brand Axles.

KOCH A. B. COMPANY, Peoria, Ill., show various arrangements of goods displayed by the use of the Koch system of shelving. They show the open unobstructed front secured by this method of store fitting. There are no partitions, stiles or posts in the way to hinder placing the goods together as is most convenient to have them. The brackets can be shifted, making the shelves the desirable distance apart to accommodate various lines of goods as they come in season. Sections of shelving may be added or removed, additions to the shelving can be made above or below, the shelving appearing complete at any time.

JOSEPH F. MCCOY COMPANY, 26 Warren street, New York, in their advertisement in this issue call attention to Coates' Patent Clippers for horses and barbers, for the sale of which they are manufacturers' agents. They advise us that they have a large assortment of these goods and are prepared to fill orders promptly.

GRAND RAPIDS HAND SCREW COMPANY, Grand Rapids, Mich., call attention to the fact that the thread of their Wood Screws are saw cut, not cut with a V-shaped tool. They claim that the saw cut leaves the grain of the wood solid, and that it makes the Screw much more durable. They state that nothing but second growth hickory is used in their manufacture, and that the workmanship is the best.

SIMONDS MFG. COMPANY, Fitchburg, Mass., advise us that their Cross Cut Saws are now all crescent ground, resulting in an absolutely uniform gauge throughout the toothed edge, with a taper of five gauges in the middle of the blade, being three gauges heavier on the back ends than in the middle of the back. They compare this improved manner of grinding with their former practice of grinding Cross-Cut Saws straight across the stone, thus making the teeth of uneven gauge, requiring an uneven set in order to cut a uniform kerf—a saw, they state, that had to pay for every bit of its thin back by a corresponding thinness on the ends of the back, which weakened it and caused it to vibrate, also to buckle in the cut. They

refer to appreciation shown by live loggers and lumbermen of Saws ground in the improved manner, and remark that such appreciation is indicative of men who keep pace with the times.

THE NEW BRITAIN HARDWARE MFG. COMPANY are now making a full line of Machine Screws, both regular and special. This department is well equipped with new machinery and in charge of a competent superintendent. The company advise us that it is their purpose to make nothing but first-class work and build up a reputation for careful attention to details. The company still continue to manufacture a full line of Piano Hardware and are giving special attention to making Bicycle Parts, Bolt Screws, &c.

ATTENTION IS DIRECTED to the advertisement of J. Curley & Brother, on page 62 of this issue, relating to Curley's Reversible Safety Guard Razor. Curley & Brother have lately moved into a commodious store, No. 6 Warren street, which they have fitted up in an elegant manner, with all the modern conveniences for doing business. Three floors of this building have been expressly fitted to the requirements of their Cutlery business, which had grown to such an extent as to compel them to leave their former quarters, where they had been located for 29 years.

A CHANGE OF OWNERSHIP of the Rhode Island Horse Shoe Company is announced. The plant, patent rights and good-will of the company were sold last week to pur-

ON THE MORNING of October 6 the Springfield Hardware Company, Springfield, Mo., found themselves short about 30 to 35 Smith & Wesson and Colt's Revolvers. Burglars had entered the store during the night, gaining entrance by forcing open the front doors. The loss in goods and cash amounted to \$300 to \$325. No clue has thus far been found to the burglars.

DAVID ROBERTSON and wife, who have been spending the last six months in Europe, returned to Portland, Ore., in safety on the 26th of last month.

THE POINTER PICTURE HOOK COMPANY, Adrain, Mich., have transferred their entire Hook business to the Scotford Mfg. Company, Kenosha, Wis., and all future communications should be addressed to them. The latter company propose to manufacture and put the goods on the market, both the Flat and Wire Hook.

Improvement in Labels.

WE TAKE pleasure in reproducing a label for Loose-Pin Butts recently adopted by McKinney Mfg. Company, Allegheny, Pa., manufacturers of Steel Strap, T and Butt Hinges. It will be noticed that there are three divisions in the vacant space on the label, which may be used for cost, price by the box and price per pair; or for any

1-2 DOZ.	No.	STEEL	3 1/2"	x	3 1/2"	In.
713						
LOOSE PIN BUTTS.						
STEEPLE TIPS.						
FITTED FOR No. 11 SCREWS.						
M'KINNEY MANUFACTURING CO.						

The McKinney Mfg. Co.'s Label.

chasers who are understood to represent a syndicate of New York capitalists who have been negotiating with the company for some time. The present officers, under the agreement, are to conduct the business for the new owners for a term of years, so that it is anticipated that there will be no material change in the affairs of the company so far as the trade are concerned. The plant is located at Valley Falls, R. I., and is described as having an output of about 1000 kegs of Shoes per week.

MANY OF THE TRADE will observe with interest the portrait on another page of R. A. Neal, together with a sketch of his career, for the principal facts in which we are indebted to W. R. Walkley. The biography of Mr. Neal is one of special interest, from the prominent position which for many years he occupied among Hardware manufacturers, having been conspicuously identified with the development of Hardware interests of the country.

THE TRADE will observe on another page the advertisement of Horace F. Sise as Hardware Commission Merchant, 114 Chambers street, New York. Mr. Sise is Western agent for Barnes Mfg. Company, Graham Mfg. Company and other manufacturers, giving personal attention to Western traveling. He is also in a position to represent in that territory. The opportunity is certainly deserving the attention of those who desire their goods efficiently represented in that section.

other arrangement of marking desired. The labels are of colored paper, making a background on which the black letters and figures show plainly. Prominence is given to the size and number, these being distinct enough to be seen at a distance. This is a reform in the arrangement and printing of labels which has long been desired, and no doubt the retail trade will appreciate the efforts of these manufacturers to provide improved facilities for marking goods, and to furnish a readable label. We are advised that as fast as their old stock of labels is exhausted they will be replaced by labels similar to that shown in the cut, and that hereafter this style of label will be placed on all goods made and sold by the company. The matter of labels is one deserving the careful attention of other manufacturers, as many of the labels in use are far from satisfactory.

THE CLEVELAND SPECIALTY COMPANY, Cleveland, Ohio: Perfection Door Lock. The Lock is designed for fastening doors on delivery wagons. The manufacturers describe the spring as made of the best quality of steel and the plates of the best malleable iron. All parts are milled and fitted together in a thorough and workman-like manner.

Roswell Alcott Neal.

THE HISTORY of a man's life is more or less the history of the times in which he lived. He exerted an influence on the age, and was molded and shaped to a greater or less degree by the circumstances which surrounded him. Success and wealth are each relative. A person living in a country town or a small city seeking and attaining a position of commanding influence probably derives as much satisfaction and happiness upon the accomplishment of his desires as another person in different relations does when he secures the objects of a higher ambition. Success cannot be weighed in coin, neither can happiness be measured by feet and inches.

There is a power born in man, growing and developing with his growth, constantly urging and pushing him on to do better work and to accomplish higher aims than has been done or accomplished by his fellows. We call this ambition, and it seeks as many paths and they are as intricate as those in the fabled labyrinth of old. Many who attempt to follow lose sight of their guide, and the dimness of their vision and the dullness of their ears prevent their seeing the magic wand ever held out and beckoning them on or hearing a voice whose silvery notes are a continual song of encouragement.

This unknown force is natural to all. It is a powerful ally; an angel of hope; an architect who builds colossal fortunes; a general who achieves glorious victories; a king before whom all men do reverence. Yet it is a plant of tender growth, and will not survive bitter frosts or the keen cutting winds of wintry months. Oft it dies early in the human heart, and men without ambition are like stranded wrecks upon the shore, washed and wasted by the eternal sea.

The man in whom ambition lives and grows becomes a power for good or ill. Every footfall leaves an impress, and every blow strikes fire from the anvil. Where the impression is made and what the fire burns depends upon the position the man is in, but it is an impression and it is fire. This indescribable power, perhaps never correctly defined, and incapable of measurement, was a vital force all through this life of which we write.

The majestic oak, with its huge trunk and wide-spreading branches—the king of the forest—grew in soil affording nutriment adapted to its wants. It was nursed

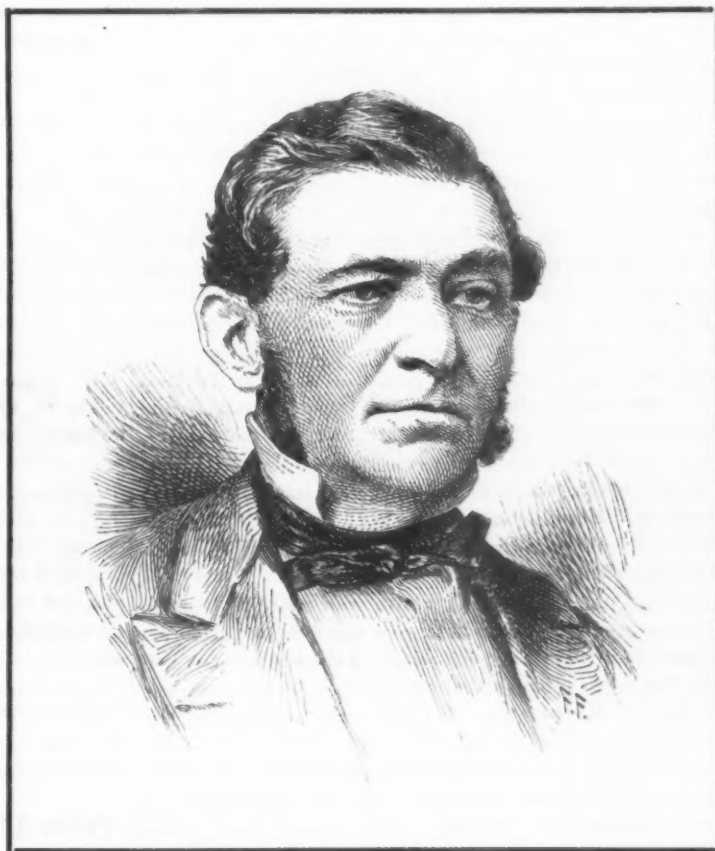
by the sunlight and rocked in the cradle of the winds. The gnarled and dwarfed tree at a little distance sprang from as good an acorn, and perchance would have become as great an oak had not a foot crushed and broken the tender twig. Times and circumstances do influence lives.

Roswell Alcott Neal was born in New Hartford, Conn., January, 1821. His father, Elisha Neal, and his mother, Naomi Frost, as their names indicate, were both descendants from that Puritan stock from which sprang so many men and women who have been potential factors in making and shaping our history. If the soil of New England is cold and bar-

limited, and his advantages few. The zeal and earnestness which characterized him in his maturer years were at his command in his boyhood, and he made them his servants thus early in life.

It was always a source of regret to him that his early education was so limited, and that he did not have better facilities for acquiring that knowledge which would have been of great use to him through life. In later years he was a staunch friend of education and the school, impressing upon all the value of learning. For a number of years he was president of the Board of Trustees of the High School at Southington, and his children were educated in the best schools of the

State. His first employment as a manufacturer was in his father's shop at clock making. This business was not an uncommon industry in Connecticut at this time, and the product was the genuine Yankee clock, whose fame and reputation have been more enduring than that of the makers themselves. If he had an aptness for this mechanical work he must have found it unprofitable, for at the age of 19 he abandoned it and found employment on a farm in the town of Bristol. Here he remained until he became of age, and doubtless derived great physical benefit from this health-giving occupation. His ambition led him to look beyond the hills of a country town, and he desired to see something of the larger world beyond. If the Yankee schoolmaster was abroad no less was the Yankee peddler. Both are historical; each was an educator—a



ROS WELL ALCOTT NEAL.

ren it has been wonderfully productive of men—of men reared by mothers who worked and thought, and taught their sons the nobility of labor and the royalty of mind. Few lessons were learned from books at school. Necessity compelled labor. Industry was a schoolmaster and nature a teacher. Body and mind were each cultured and trained. The daily toil developed the body and made strong men. The evening discussions around the blazing logs were productive of thought, and led an inquiring mind to investigation and decision. Questions of theology, principles of government, and oft-told tales of history were the common themes of a winter's eve. At this period the common schools of Connecticut were doing much for the education and training of the youth of the State. However, Mr. Neal spent but little time in them. His opportunity for the study of books was

character peculiar to the times; the source of most thrilling tales and the most ludicrous narrative. From Connecticut to Maine to sell clocks was Mr. Neal's first tour as a salesman. He certainly must have been one of the original "drummers." These trips were continued as far as New Brunswick, to afford our brothers across the line a chance to hear the "tick-tock" of a Yankee Clock. They were not undertaken for health, but to make money. The distance which may now be accomplished in a single night then required weeks of fatiguing travel. The stories of a "Yankee Clock Peddler in Maine" would fill volumes, and the memory of these days and the incidents they recalled were always a source of pleasure to Mr. Neal. He met with fair success in this enterprise and laid aside a little, which was the foundation of his fortune. He next entered into partnership with M. W.

Atkins of Bristol and engaged in the manufacture of Steelyards, which business he continued through his active life and it is now kept up by his successors. This partnership was dissolved in 1849, at which time he moved to Southington, Conn., where he continued to reside until his death. At Southington he became connected with a firm which three years later was formed into a stock company, under the name of the Peck, Smith Mfg. Company. Here he really began his life work. During the previous years he had been in training, gathering information from various sources, observing and studying men, familiarizing himself with the conditions of trade and fitting himself for the business of the coming years. He retained his connection with this firm, and in 1861 was elected its president, which position he held continuously until it was incorporated with its successor in 1870.

The period embraced between 1849 and 1870 may be fairly styled the rise and progress of manufacturing. These years were full of changes in methods of both making and selling Hardware. Mr. Neal was eminently progressive; he kept apace, if not ahead of his competitors. He was one of the very first who traveled West to sell his product. His success was commensurate with his efforts. He was courteous and frank. He always did as well as he agreed, sometimes better; the trade had confidence in his word. He was full of hope and encouragement; he left men feeling better for his visit. He felt the pulse of the market, and usually made a correct diagnosis of its condition. He was an excellent judge of character. He made liberal terms. He won and deserved confidence. But he hated shams and pretensions. He was a man of strong prejudices, and if he disliked a house and its methods, his dislike was as genuine and as bitter as his love was strong for his friends. During this period the firm with whom he had cast his fortunes was most prosperous. Their growth and development was remarkable. Their capital was increased from \$50,000 to \$150,000. The dividends to the owners were large and regular. During one year 100 per cent. was paid, during another year 60 per cent., and for several years a dividend of 25 per cent. was declared. This period probably represented Mr. Neal's best efforts and work. He was known throughout the Hardware trade as a representative man—a man of deeds rather than of words, quick to conceive, and quick to execute. Here, perhaps, was one of the most prolific sources of his success. While others estimated, investigated or planned, he consummated. During the latter years of the period above named competition among manufacturers greatly increased and the profits were narrowed to smaller margins.

Several competing firms were located near Southington, and it seemed desirable to harmonize their interests if possible. Mr. Neal sometimes has been accredited with originating the plan which afterward led to the consolidation of these competing houses into the present organization of the Peck, Stow & Wilcox Company, which an

old merchant said to the writer the other day was really the first of the modern trusts. But S. C. Wilcox, now deceased, first suggested the idea in the early spring of 1870, though he did not develop the methods which were afterward carried out. Indeed, the plan suggested met with severe opposition on the part of one of the principal firms, its stockholders voting against the combination by a large majority; and not until after labored arguments did they consent to the union, which was simple and not at all in the nature of a trust. Each separate firm sold out its business, real estate, good will and everything pertaining to it, except its bills receivable, to a new corporation, organized under the general laws of the State of Connecticut, called the Peck, Stow & Wilcox Company, having at that time a capital of \$635,000.

This new company was established in 1870, and immediately purchased the companies who had voted to sell. Mr. Neal was at once elected president of the Peck, Stow & Wilcox Company, which position he filled continuously until his retirement from business in January, 1887. From 1870 to 1884 he continued to labor with the same untiring zeal and industry which had characterized his previous work. His methods, except as they had been modified and changed by the times, were the same. He had wide experience, vast resources of energy and determination. The business of the new firm was largely increased, and by the division of labor the cost of production was considerably lessened. The capital of the company was increased at different times, both by cash payments and by dividends, until at the time of his retirement it was \$1,500,000. From 1884 to 1887 his health was not good, and he was unable to give that personal attention to business which during 35 years had commanded his best powers and energies. Paralysis and the gradual decay of his physical forces compelled him to lay aside the duties of his position, and in January, 1887, he resigned his office as president of the company, and retired from active business. His eye was undimmed and his mental forces unabated. Thus he lingered without great bodily suffering until August 15, 1891, when in his own home, surrounded by kindred and friends, "the silver cord was loosed and the golden bowl broken." Though Mr. Neal's business career seems to have been closely identified with the Hardware manufacturing above named, he was much interested in other local companies, and did much to establish and promote their interests. He was for a number of years president of the Southington Cutlery Company, the Ætna Nut Company, the Ætna Match Company and the Southington National Bank and a director in other banks, insurance companies and corporations. Mr. Neal was not much of a politician. He had his own views and opinions, and usually voted with the Democratic party. He represented the town four times in the State Legislature.

In his religious belief he was a Baptist, denominational, but not sectarian. He was a liberal giver, charitable in the highest

degree and in the best sense of the word. He was a man of medium weight and stature, of erect carriage, with dark hair and a piercing eye. He was of plain speech, with simple and unassuming manners; easily approached and unpretentious in every way. He was a man of the people, and in touch and sympathy with all his fellow men. At times stern, but with a heart that would melt at the bare recital of a story of injustice or suffering. In many respects Mr. Neal was a man of unique character. Solid, without adornment, with pure and unselfish motives; honest in heart and soul. An every-day man, with untiring industry, a zeal born of his hopes and ambitions. A firm and steadfast friend and a bitter enemy. With pluck and perseverance that overcame all obstacles, never suffering defeat and never resting until he had accomplished his end. Laughing at failures, never fearing competition, with the confidence of a victor he entered the arena to win. The qualities of mind and heart as revealed to his associates in their daily intercourse with him were the qualities which make and keep friends. He worked with conscience and courage. He was straightforward and thorough, never assuming to be what he was not nor affecting what he did not feel. He was content to be and to appear what he was. He was manly and sincere, with a warm, generous heart. He was quick to appreciate changed conditions and the forces of progress. His opinions were his convictions. He was no friend of display or ostentation, but had a real liking for plain speech and friendly intercourse. His memory was most tenacious of details and facts. He spoke with directness and to the point. His mind remained unclouded while his physical forces were decaying. These qualities of heart and soul endeared him to his associates and they regard his death as a personal loss. His departure was the end of an active and honorable business life.

Price-Lists, Circulars, &c.

JOHN M. WADDEL MFG COMPANY, Greenfield, Ohio: Family Coffee Mills, Rat Traps, Clothes Bars, Money Drawers, Simplex Cash Registers, &c. In their 1891-92 catalogue the manufacturers state that the novel features introduced in their Family Coffee Mills have resulted in producing a line of goods which have proven ready sellers; and that as the result of recent improvements they are enabled to produce exceptionally good Mills.

WYETH & McCULLY, Newark, Ohio: Runner Attachments for use on all kinds of iron-axle buggies, carriages, hacks, surreys, spring wagons, two wheelers, &c. They also manufacture Bob Sleds, Tank Wagons, Trucks and Light Vehicles.

H. H. JONES, Lancaster, N. H.: Bevel Pointed Belt Hooks. These are made extra heavy from a fine quality of Norway iron, and machinery has recently been perfected for the manufacture of them in large quantities.

WILLIAM HIGHTON & SONS, Boston, Mass.: Hot-Air Registers, Ventilators, Borders, &c. In their price-list they call attention to the addition of new sizes also to their new style of Convex Registers with vertical wheel movement, as well as to the addition of new designs and other important improvements. They state

that they have greatly increased their facilities for manufacturing, and will add from time to time new sizes and designs to suit the requirements of the trade.

THE BROWN, HINMAN & HUNTINGTON COMPANY, Columbus, Ohio: Farm and Garden Tools for 1891-92. Scythe and Bush Snaths, Grain Cradles, Forks, Potatoes and Manure Hooks, Field, Garden and Mortar Hoes, Handled Planters' Hoes, Steel and Malleable Rakes, &c.

RUDOLPH MFG. COMPANY, Chicago, Ill.: Rudolph's Jointed Ring Landing and Dip Net Handles. These are referred to as being strong and compact. The ring is jointed in the middle and so arranged as to admit of its being put away in a 31 or 48-inch handle. It is claimed that it is impossible to pull or spring out the ring when adjusted.

L. S. STARRETT, Athol, Mass.: Fine Tools, October 1, 1891. Attention is directed to reduced prices on Combination Squares, special Standard Squares, Protractors, Combination Sets, Double Squares and the full line of Steel Rules, also to the slight advance in price on one style of Surface Gauge and a few sizes of Levels. The catalogue shows a number of new goods, which will be of interest to the trade.

BRONSON SUPPLY COMPANY, Cleveland, Ohio: Never-Break Wrought-Steel Cooking Utensils. The front cover of their artistic catalogue has red raised letters on a bronze background. The catalogue refers to their line of Never-Break goods, illustrating and giving price-lists of these goods. The last half of the catalogue is devoted to their French Porcelained Never-Break Ware, which is white inside and purple outside. Illustrations, price-lists and descriptions of these goods are printed on tinted paper, adding much to their attractive appearance.

A. J. PHILLIPS & Co., Fenton, Mich.: Screen Doors Adjustable Window Screens, Window Screen Frames, Snow Shovels and special Woodenware. Snow Shovels are shown in various styles, both in long and D handles; also Snow and Stable Scrapers. The manufacturers state that their business in Screen Doors and Window Screens has increased from year to year, and that they have endeavored to increase their capacity to correspond. The past season their sales exceeded half a million, while their capacity was only about four hundred thousand. They have just added another mammoth warehouse and have otherwise increased their facilities and expect to be able to provide for the demand.

LOGAN & STROBRIDGE IRON COMPANY, New Brighton, Pa.: Catalogue No. 5, also advance pages of catalogue No. 6. The first of these is devoted to Thumb Latches, Gate Hinges, Sash Pulleys, Sash Lifts, Shelf Brackets, Wardrobe Hooks, Chest Handles, Counter Legs, Door Bolts, Cess-pools, &c. The book is nicely printed on a good quality paper, the cuts being clear and distinct. Catalogue No. 6, which is now in press, will contain Fire-Iron Stands, Cottage Kitchen Sets, Fire Irons, Shovels, Coal Claws, House-Furnishing Hardware, Five and Ten Cent Goods and specialties manufactured by this company.

It is Reported—

That A. W. Gray has commenced the Hardware business at Bidell, Ill.

That H. Russell & Co. are a new Hardware firm at Madison, Maine.

That Joseph Frieze has bought out the Hardware store of M. J. Hart, Glidden, Wis.

That Scott & Morrill, dealers in Hardware at Sandy Hill, N. Y., have dissolved partnership. The business will be continued by James B. Morrill.

That Wm. H. Smith, for the past five years of the firm of Smith & Adams, Worcester, Mass., and for many previous

years with Henry W. Miller, has purchased the Hardware stock and business of W. H. Goulding & Co., in that city, and will continue it under the name of W. H. Smith & Co.

That E. J. Udell has opened a Hardware store at Indianapolis, Ind.

That Norman Hough will open a Hardware store at St. Johnsville, N. Y., in a few weeks.

That T. A. Davis is about to engage in the Hardware business at Superior, Wis.

That Frank Seifert's Hardware store at Jefferson, Wis., was recently burglarized and a considerable quantity of Knives, Razors, &c., taken.

That Joseph A. McCreery is a new Hardwareman at Fall River, Mass.

That Clark & Cooley, Lumber and Hardware merchants at Riegelsville, Pa., have purchased the Hardware store and lumber yard of the Dalrymple estate at Bloomsbury, N. J.

That J. L. Kiff will erect a building at Corning, N. Y., which he will occupy as a Hardware establishment.

That the Hardware and Implement store of J. F. Lee, Lainsburg, Mich., was robbed on the 1st inst., the value of the goods stolen being \$100.

That the Hardware business of A. A. Reynolds & Co., at Shingle House, Pa., has been purchased by Messrs. Frank and Gale of Wellsville, N. Y., who have taken possession of the old stand.

That Fred. Dana, Wiscasset, Maine, is moving his Hardware store to larger quarters in that place.

That C. W. Williams' Hardware store, at Amsterdam, N. Y., was recently robbed.

That the Hardware store of Moles & Co., Duluth, Minn., was destroyed by fire October 6.

That Henry Sangster, formerly with the Judson Company, Berkeler, Cal., has opened a Hardware store in that place.

That Wilson & Vantile have commenced the Hardware business at Jamestown, N. Y.

That the Pickett Hardware Company have succeeded the firm of Pickett & Co., Warren, Pa., having purchased the entire stock of Hardware, Oil Well Supplies, &c. The officers of the new company are W. H. Pickett, chairman, and Harry W. Pickett, secretary and treasurer. The paid-up capital is \$50,000.

That on the morning of the 10th inst. the store of the Seavey Hardware Company of Fort Wayne, Ind., was entered by burglars and the safe blown open. Two hundred and fifty dollars in cash and some valuable papers were taken.

That Julian McFarland will engage in the Hardware business at Arkansas Pass, Texas.

That Joel Stoner has purchased the Hardware store of Musser & Kunkle, Wrightsville, Pa.

That the Little Falls Hardware Company, St. Paul, Minn., have been incorporated, with a capital of \$50,000.

That Chas. Hood has purchased J. P. Meeker & Co.'s interest in the Puyallup Hardware Company, Puyallup, Wash.

That F. S. Naramore's Hardware store at Silver Springs, N. Y., was burglarized last week to the extent of \$300.

That J. K. Johnston is opening up a new Hardware store at Du Bois, Pa.

That Elias Overton expects to open a Hardware store at Nebraska City, Neb., in a few weeks.

That Lawrence and Henry Grambs will open a Hardware store at Bismarck, S. D.

That C. J. Hamot has purchased the entire stock of Hardware of the Burger-Alexander Company, Hastings, Neb., and will conduct business at the old stand.

Exports.

ADDITIONAL SHIPMENTS PER BARK ELINOR VERNON, FOR AUCKLAND, NEW ZEALAND.

By A. S. Lascelles & Co.—1 case Cutlery, 4 dozen Cow Bells.

By W. H. Crossman & Bro.—7 packages Hardware, 1 case Egg Beaters, 20 dozen Axes.

By R. W. Forbes & Son.—3 cases Plated Ware, 11 cases Horse Nails, 99 dozen Axes.

By H. W. Peabody & Co.—90 packages Hardware, 17 crates Fiber Ware, 100 pounds Horse Nails, 2 cases Pumps, 3 cases Traps, 2 cases Egg Beaters, 2 cases Mouse Traps, 4 cases Empty Shells, 1 box Emery Wheels, 3 dozen Wringers, 11 packages Lampware, 47 packages Hardware, 1 case Farming Implements, 1 box Oilers, 5 cases Horse Nails, 3 cases Traps, 1 case Scales, 1 case Hardware.

FOR DUNEDIN.

By R. W. Cameron & Co.—6 Knives, 5 dozen Axes, 4½ dozen Hatchets, 5 dozen Hammers, 106 pounds Cordage, 377 pounds Saws, 4 kegs Nails, 1 case Bolts, 5 cases Cages, &c., 1 case Hardware, 2 boxes Snaths.

By R. W. Forbes & Son.—3 cases Hardware, 5 dozen Axes.

By A. S. Lascelles & Co.—22 cases Nails.

By W. H. Crossman & Bro.—5 packages Lamp Goods.

By Strong & Trowbridge.—2 cases Hardware, 2 cases Bolts, 5 packages Hardware, 1 case Traps, 1 barrel Blocks, 10 cases Axes, 2 cases Hardware.

By H. W. Peabody & Co.—1 case Cartridges, 13 packages Lampware, 1 case Air Rifles, 1 case Pumps, 10 cases Horse Nails, 1 case Edge Tools, 5 packages Hardware, 5 cases Wringers, 1 case Bolts, 1 case Hardware, 3 cases Nails, 3 cases Wringers, 2 cases Sandpaper, 75 packages Hardware, 2 cases Pumps, 3 crates Churns, 6 crates Stoves, 6 cases Horse Nails, 12 cases Wringers, 6 crates Churns, 6 crates Step Ladders, 1 case Files, 6 cases Wringers, 6 cases Horse Nails, 1 package Drills, 1 case Pumps, 21 packages Lampware, 5 cases Horse Nails, 16 packages Hardware, 1 case Thermometers, 5 cases Horse Nails, 1 case and 3 packages Hardware, 1 package Egg Beaters, 5 cases Nails, 1 case Mangles, 5 packages Lampware, 9 cases Horse Nails, 2 cases Nails, 3 cases Hardware, 9 packages Lampware, 28 cases Wringers, 6 packages Hardware, 4 dozen Hoes, 3 cases Wringers, 4 cases Nails, 2 cases Hardware, 1 case Tacks, 2 cases Hardware, 2 cases Sandpaper, 2 cases Hardware, 2 cases Sandpaper, 3 packages Hardware.

PER BARK ST. LUCIE, OCTOBER 7, 1891, FOR WELLINGTON, NEW ZEALAND.

By A. S. Lascelles & Co.—6 cases Nails.

By R. W. Cameron & Co.—1 box Scales, 1 case Hardware.

By Alfred Field & Co.—1½ dozen Wringers.

By F. B. Wheeler Co.—2 cases Hardware.

By Hartley & Graham.—10 cases Cartridges, 1 case Empty Cartridge Shells, 1 case Rifles and Tools, 2 cases Metallic Cartridges, 17 cases Cartridges, 1 case Empty Shells.

By Wiebusch & Hülger.—2 cases Rifles, 5000 Cartridges.

By Henry Disston & Sons.—7 cases Hardware, 3 cases Saws.

By Winchester Repeating Arms Company.—1 case Cartridges, 1 case Guns.

By Meriden Britannia Company.—4 packages Silverware.

By Joseph F. McCoy & Co.—11 cases Lamps.

By F. H. Lovell & Co.—15 cases Lamp Goods.

By McLean Bros. & Riggs.—6 dozen Wrenches,

2 dozen Saw Gummers, 2 cases Bush Hooks,

1 package Scales, 1 case Hammers, 20 packages Axes, 1 case Bolts and Nuts, 4 cases Hardware, 1 case Pistols, 2 cases Wringers, 1 case Curry Combs, 2 packages Lampware, 1 case Egg Beaters, 2 cases Levels, 4 cases Churns, 1 case Hammers, 1 case Drills, 5 cases Cartridges, 5 cases Axes, 2 cases Hatchets, 1 case Wire Cloth, 4 cases Farm Tools, 8 cases Wringers, 4 cases Axes, 6 packages Lampware, 8 cases Cartridges, 1 case Churns, 3 cases Bench Screws, 3 cases Bird Cages, 2 cases Mattocks, 2 cases Bench Screws, 1 case Cartridges, 2 cases Harness Menders, 1 case Hay Knives, 3 cases Mattocks, 6 cases Picks, 3 cases Coffee Mills, 1 case Traps, 3 packages Wire Goods, 1 case Saws, 3 cases Wringers, 2 cases Mattocks, 6 packages Hardware, 1 case Wrenches, 4 crates Churns, 1 case Rules and Bevels, 2 cases Scales, 6 crates Anvils and Vises.

By R. W. Forbes & Son.—1 case Lawn Mowers, 4 boxes Lampware, 2 cases Britannia Ware.

By H. W. Peabody & Co.—3 packages Lampware, 2 cases Hardware, 8 cases Horse Shoe Nails, 12 packages Hardware, 3 cases Wringers, 3 racks Churns, 2 cases Bolts, 3 cases Scales, 17 packages Hardware, 2 cases

Wringers, 1 case Nails, 23 packages Hardware, 5 boxes Silverware, 4 cases Hardware, 2 cases Farming Implements, 3 racks Churns, 3 cases Horse Nails, 11 cases Wringers, 18 packages Hardware, 1 case Emery Wheels.

By Arkell & Douglas.—20 dozen Shovels, 21 cases Cages, 14 cases Wringers, 2 packages Pumps, 7 cases Meat Choppers, 3 cases Nails, 6 cases Axes, 40 kegs Nails, 19 cases Tools, 11 cases Hardware.

By W. H. Crossman & Bro.—1 cask Lamp Goods, 4 cases Wrenches, 3 cases Forges, 1 case Lead Pencils, 4 cases Iron Nails, 1 case Mangles, 17 cases Horse Nails, 13 cases Scales, 15 cases Wringers, 8 crates Churns, 2 packages Miners, 1 case Forges, 7 cases Shovels, 1 case Revolvers, 6 packages Lamp Goods, 46 packages and 1 case Hardware.

Paints and Colors.

It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.

In the conditions governing operations in Paints and Colors there have been no striking changes during the week under review. Turbulent weather has doubtless interfered with the spread of Paint in a wide territory that draws supplies from this center, since jobbers note a falling off in the distribution of house-painters' specialties and discover nothing else that would account for it. What hesitation or temerity may have grown out of the late decline in price of Linseed appears to have disappeared and in other materials no changes have taken place that would influence the operations of retailers or boss painters. Pig Lead is a trifle off, but not to an extent that would have any decided bearing upon the market for the leading pigment.

White Lead.—Outside of the routine distribution there has been little or no movement during the past week. Jobbers' purchases of the corrodors' product are governed in a great measure by the outlet they have, and the tendency seems to be more than ordinarily conservative now that the season for gradual falling off in the consumption is near at hand. Cost of crude material has receded somewhat, but that fact evidently has little if any influence. In Mixed Leads there has also been a quieter trade, due in part to the influences above referred to. Manufacturers' price have undergone no change, however, and concessions by jobbers are merely in line with those that have been common for some time past.

Zincs.—Large consumers are placing orders at intervals for fair sized lots of American Oxide, but the demand is not as steady as it was early in the month. Still, those orders and the smaller ones received from other quarters keep production well under control, and in the absence of any change in the existing relations between manufacturers prices remain very steady. In foreign brands there is a very fair movement, with prices the same as current for some time past.

Colors.—In the general line of grinders' Colors there is about the routine movement, and prices throughout are holding quite steady in the absence of radical change in the offering or new influences calculated to materially affect cost. House-painters' Colors are equally as devoid of change. The rise in Quicksilver has not as yet caused manufacturers to revise their figures for English Vermilion, and goods of the more staple character move out at old figures. Mixed Paints are selling fairly, but not as freely as they did a week or two ago.

Miscellaneous.—Local manufacturers are reluctant to give prices on Putty for publication, and when they do the figures are purely "nominal"—in other words, greatly deceptive. Their quotations at present are 1½¢ @ 1½¢ for tubs, 2¢ @ 2½¢ for tin cans, and 2¢ @ 2½¢ for bladders. That sales

are being made at those figures is very doubtful, since Philadelphia competitors openly quote \$1.35 @ 100 lb for 800-lb barrels; \$1.40 for 400-lb half-barrels; \$1.45 for 100-lb round tins; \$1.50 for 50-lb do.; \$1.60 for 25-lb do.; \$1.80 for 12½-lb tins and bladders and \$2 for 5-lb tins. City manufacturers state that "they do not make Philadelphia putty," and intimate that the latter is an inferior article. On this point opinions differ, as well as on the accuracy of quotations given by city manufacturers. It is evident that Philadelphia is enterprising and not slow to give the trade some of the benefits of the reduction in cost of Linseed Oil.

There has been no change in the situation of the market for Block Chalk, and dealings are momentarily light. Whiting is firm at old prices, manufacturers being busy on orders calling for deliveries this month and next. Barytes and the general line of Clays are selling at former prices, but in moderate quantities only.

Oils and Turpentine.

In some lines of Oils there have been a fairly active trade, and in others business has dragged along somewhat wearily, for want of stimulus to freer action on the part of buyers. This condition of affairs has led to the development of a weakish undercurrent to values in some lines, but the changes resulting therefrom are not of remarkable character. The only movement of importance has been on city brands of Linseed Oil, the price of which was cut to meet outside competition. Dealers are hopeful of a better trade in most lubricants during the next 30 days.

Linseed Oil.—Two reductions in prices have been made by city crushers the past week, the last one bringing their figures down to 37¢ for domestic seed product. That cut brought net cost to the jobber and large consumers down to a point relatively quite as low as the prices at which Western brands have been selling. It does not transpire that the outside manufacturers have made any reduction from 35¢, although some buyers claim that bids of 34¢ for carloads are solicited. In any event, the contest seems to check rather than stimulate purchases for the time being, although, according to good authority, Western Oil cannot profitably be produced at 34¢ unless seed is secured at a considerable reduction from present cost. In this connection it is noted that ruling prices encourage export purchases of the raw material.

Cotton-Seed Oil.—A few parcels of new crude have arrived and were taken at 31¢. Several hundred barrels were sold for future delivery at 30¢ for prime quality and a lot went at 30¢ on the spot. The buying is slow and cautious, but sufficient to show a fairly firm market. In refined product business has been hardly up to the average for the season, but refiners offer sparingly and prices hold quite steady. Transactions were chiefly at 34¢ @ 35¢ for prime new Summer Yellow; 32¢ @ 33¢ for "off" grade, and 29¢ @ 30¢ for reddish stock.

Fish Oils.—About 3000 barrels of crude Sperm Oil have been sold in the East at 68¢, but no fresh transactions in crude Whale or crude Menhaden are noted. The manufactured products are moving off in a jobbing way at former rates. Cod Oil is firmer at 34¢ @ 36¢, as to quality.

Miscellaneous.—Lard is weaker, with best brands offered at 55¢ and others at 54¢. Ceylon Coconut Oil is also lower at 6¢ @ 6½¢ on the spot, and Olive Oil, in barrels, down to 62¢ @ 65¢, as to delivery.

Spirits Turpentine.—Prices have receded to 37¢ @ 37½¢, as to style of package, and the market is rather dull at the decline. Stocks at leading points are large.

The Wissahickon pipe bridge or aqueduct, which spanned Wissahickon Creek a short distance above Gorgas lane, Fair-

mount Park, Philadelphia, is being demolished. It was erected by the Water Department in 1870, from designs furnished by the late Frederic Graeff, and cost about \$71,000. It is entirely of iron, constructed in four spans, resting on Phoenix columns, and was 650 feet long and 120 feet above the water level of the creek. Since its erection it has been regarded as one of the features of Wissahickon scenery. For some time past it has not been in use, one entire line of cast-iron pipes having been cracked throughout by the water freezing therein during winter. The aqueduct served the purpose of carrying water from the Roxborough reservoir across the Wissahickon Valley, which is now done by means of pipe line placed under the bed of the creek. The old structure was sold as it stood by the Water Department to G. W. Schultz & Co., iron and steel brokers, Philadelphia, who will dispose of the iron to bridgebuilders, or as scrap. Quantities of dynamite are placed on the pipes on the junctions of the spans, and large sections of the bridge are by this means dropped into the ravine below, where they will be broken up and carted away without appreciable damage to trees or ground.

At a meeting of the stockholders of the Pennsylvania Tube Works of Pittsburgh, held in that city on Monday, the 12th inst., it was decided to increase the capital stock of the concern from \$1,600,000 to \$2,000,000. The increase goes to the old stockholders as stock dividends.

The new plant of the Monongahela Iron and Steel Company, located at Hays Station on the Pittsburgh, Virginia and Charleston Railroad, about 10 miles from Pittsburgh, was put in operation during the present week. For the present only muck iron will be manufactured, which will be sold to consumers in Pittsburgh.

Recently we made brief reference to the fact that W. T. Simpson & Co., proprietors of the American Galvanizing Works, Cincinnati, were making preparations to begin the manufacture of tin plates. Since then we have received a sample of the product, which they intend to turn out in large quantities as soon as a supply of black sheets can be obtained. The plate measures 20 x 28, IX, made with the dipping process, though later on, we are informed, patent roll plates will be produced. Theterne coating has the dull appearance characteristic of roofing plates and appears to be very heavy. The surface, however, is not remarkable for smoothness, though we do not discover any bare spots on the sample. The plant at present has a capacity of 60 boxes a day, but within a short time they expect to make their own black sheets. They hope to put on the market a special size, 20 x 84, for roofing purposes, which they will ship within a radius of 150 miles of Cincinnati in bundle form, similar to the way galvanized iron is at present being shipped. We understand that prominent Chicago architects have tested this plate and give very complimentary opinions of it.

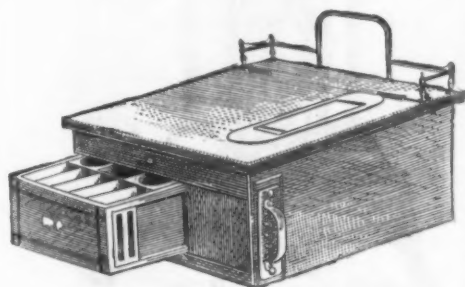
The fact that all the makers of cast-steel rolls name the same price indicates that they have reached an understanding.

Frank C. Roberts, C. E., supervising engineer of the Bristol Iron and Steel Company, informs us that this company intend blowing in their new furnace, located at Bristol, Tenn., on or about the 25th of this month.

Pittsburgh window glass manufacturers start up anew, 15th inst., and predict a tremendous boom.

Lighton Cash Register.

The John Lighton Machine Company, 512 East Water street, Syracuse, N. Y., are introducing the above register, an illustration of which appears in the accompanying cut. The machine is described as follows: The desks of the machines are substantially made of oak, cherry, and other hard wood, so as to correspond with the fittings of almost any store, and can be especially made of any kind or quality of wood when required. They are 24 inches wide, 21 inches deep and 7 inches high. Under the leaf of the desk is the machinery, which cannot be got at without permission from the proprietor, as it is provided with a patent lock. There are also four pigeon holes for private papers, &c., besides ample room for books. The entry slot on the face of the desks is 8 inches long by 3 inches wide, covered with plate glass, with the exception of a $\frac{1}{2}$ -inch opening at the bottom, where the cashier enters the amount of sales, &c. The paper is ruled, so that cash sales can be entered in one column, credit sales in another and disbursements in another. There are also columns that can be used for other accounts, such as expenses, personal, profits, &c. The combination lock keys are on the side, and are covered to prevent people from seeing what combination of keys is used in unlocking the drawer. The top is surrounded by a handsome nickel-plated railing, giving the entire an ornamental appearance, making it suitable for



Lighton Cash Register.

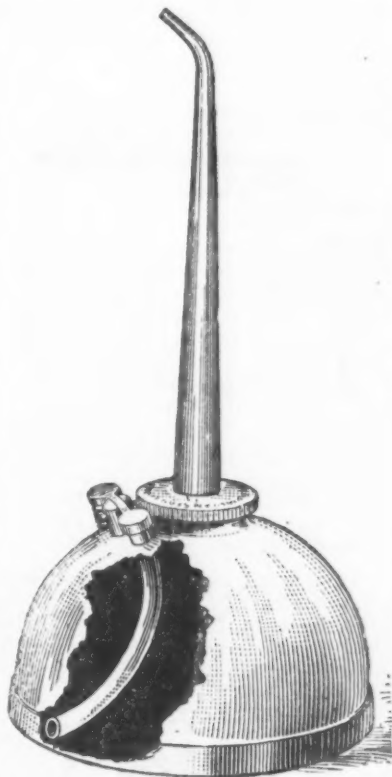
any office, and virtually making a cashier's office and desk of whatever place it may occupy. Each cash register is furnished with three rolls of paper and a pencil especially made for it.

The manufacturers claim, among the many points of excellence found in this machine, that the glass panel over the paper allows of 25 consecutive sales remaining in sight, so that in the event of any dispute the amount can be seen at a glance; that it is impossible to open the cash drawer without ringing the bell and moving the paper or register, and that where no account of its opening has been made a blank space will show; that the removing of the paper from the rolls at the close of the day's business is a simple matter; that the paper is immovable while writing thereon, and that the combination lock renders the opening of the drawer impossible unless the combination is known, while the combination can be changed at the pleasure of the operator.

The Noera Oiler.

Noera Mfg. Company, 271 Franklin street, Boston, Mass., are introducing a new invention as applied to oilers, illustrated in the accompanying cut. The vent tube with which the can is provided extends through the body of the can near its top and also extends within the can to near its bottom. The tube is normally closed by a valve on the outside of the can, the valve being readily operated by the thumb. The bottom is composed of solid

steel, doing away with the spring or flexible bottom, which, from continued use of the can, weakens the junction of the bottom to the body, often causing the can to leak. It is claimed that with this arrangement of tube the oil cannot run out of the nozzle of the can in case the can be



The Noera Oiler.

overturned. This tube is applied to railroad oilers, steamboat engineer sets, engineers' fillers, seamless mill oilers, &c.

The Handy Combination Truck.

The John B. Morris Foundry Company, Cincinnati, Ohio, are introducing a truck, as illustrated herewith. It is made of a



The Handy Combination Truck.

solid hardwood board, with $\frac{1}{2}$ -inch steel axle and $4\frac{1}{2}$ -inch wheels, and, it is claimed, well finished throughout. It is designed

to carry boxes, barrels, &c., which, it is stated, it will do as well as special trucks which are more expensive. The point is made that the truck is always handy and is never in the way.

The Whirlpool Trap.

An interesting form of plumber's trap has just been brought out by the Whirlpool Trap Company, 14 South Division street, Buffalo, N. Y. In the accompanying illustrations a clear idea will be obtained of the principal features of this de-



The Whirlpool Trap.—Fig. 1.—Broken View of S Trap without Vent.

vice. Fig. 1 shows a plain trap, while Fig. 2 shows a trap with vent pipe attached. The trap, it will be seen, consists of a cylindrical part, through the bottom of which the waste pipe rises within about a third distance of the top. The discharge water enters the trap through a pipe running down the side and connecting at the bottom. A special feature of the device, however, that is not shown in the engraving is the shape of the bottom. The upper pipe enters at one



Fig. 2.—Broken View of S Trap with Vent.

side, the bottom of the trap from the point of entrance being curved up something like a screw thread. The result of this construction is that when the discharge water enters the trap it is given an upward and rotary motion, as indicated by the arrows in the two engravings. Before reaching the top of the trap the discharge flows down the exit pipe. On account of this whirlpool, or rotary motion, it is claimed that the trap is perfectly self-cleaning. It is also said to be anti-siphonic any to keep its seal against the vacuum formed in the soil pipe. It is furthermore pointed out that there are no movable parts or partitions in the trap and no dead water. The top of the cylindrical part of the trap is closed by a cover held in place by a ring that screws down and makes a tight joint by means of a washer. In place of the plain disk for the top, a vent pipe, the bottom of which is flared out into a disk, may be used where these attachments are required. It will be noticed from the engraving that the water seal is almost the depth of the trap. S traps, half S traps and running traps of this construction are made by the company.

Forehand Arms Company's Double-Action Revolver.

Forehand Arms Company, Worcester, Mass., are putting on the market a new line of double-action revolvers of the cheaper grade, made in two styles, hammer and safety hammer, 38 and 32 caliber, respectively.* The illustration shows a hammer pistol. These revolvers have re-

also of brass wire. They are made regular sizes, not exceeding 24 inches wide by 30 inches high, and not exceeding 30 inches wide by 30 inches high. Special sizes and shapes will be made to order.

The Silver Central Draft Oil Stove.

We present in the accompanying illustrations several views of the Central Draft

drum and pillars are of Russia iron. The No. 1 size of stove weighs 12½ pounds, and is thus readily removable from one position to another. A special feature of the stove, and one to which the makers direct particular attention, is the burner, a sectional view of which is presented in Fig. 2 of the cuts. This device, it will be observed, sets down into the oil tank in such a way as to form a tight connection. When desired to use the stove for heating purposes a radiator is placed upon the top of the frame, as indicated in Fig. 3 of the illustrations. This radiator is made of polished nickel-plated castings and has a Russia iron body. The manufacturers state that a stove fitted with this radiator will comfortably warm a room 15 feet square, and is serviceable for use in dining rooms, offices, conservatories, sleeping rooms, &c. In connection with this oil stove



Forehand Arms Co.'s Double-Action Revolver.

bounding locks, rubber stocks of unique designs and are finished, the manufacturers claim, in a superior manner for this grade of pistols.

New Form of Nipple Holder.

* H. B. Spencer, Catskill, N. Y., has recently put on the market a nipple holder for holding wrought-iron pipe nipples while they are being threaded. The manufacturer says that while the general ap-



New Form of Nipple Holder.

pearance of the holder, which is illustrated herewith, is similar to the ordinary makes of nipple holders, this construction has a square tapered steel wedge operated by a screw with a removable handle; it also has bushings so that two or more sizes of nipples can be cut with a single holder. The inventor claims that a nipple can be screwed into the holder by hand without the use of tongs or wrenches and the wedge (which works on a loose pivot joint) screwed up into nipple, after which a thread of any length, either right or left hand, can be made on the nipple without the possibility of slipping or splitting the nipple, and after being threaded, the wedge can be unscrewed and the nipple removed by hand. It is also claimed that a right and left nipple, 2 inches long, can be cut and threaded with this holder without unscrewing. The holder will be made in all sizes.

* Dawson Bros., 197 to 207 North Halsted street, Chicago, Ill., are offering a line of wire spark guards, made of coppered or tinned wire and lined with fine wire cloth;

Oil Stove, which has recently been placed upon the market by Silver & Co. of No. 56 Warren street, New York City. In this stove the oil reservoir is made wholly of iron, being cast in one piece, thus prevent-



Central Draft Oil Stove.—Fig. 1.—Showing Top Tipped Back for Lighting Burner.

ing any danger of leakage. It has a capacity for holding about 2 quarts of oil and is finished in japan, both inside and out. A general idea of the stove may be gathered from an inspection of Fig. 1 of the cuts, which shows the top or drum

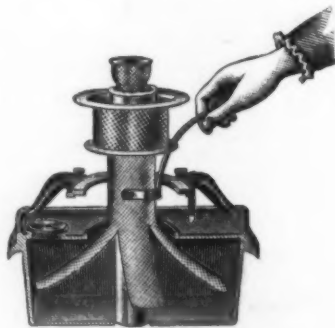


Fig. 2.—Sectional View, Showing Burner.

tipped back, exposing the wick for lighting. The tubes, burners and wick raisers are made of seamless brass, while the

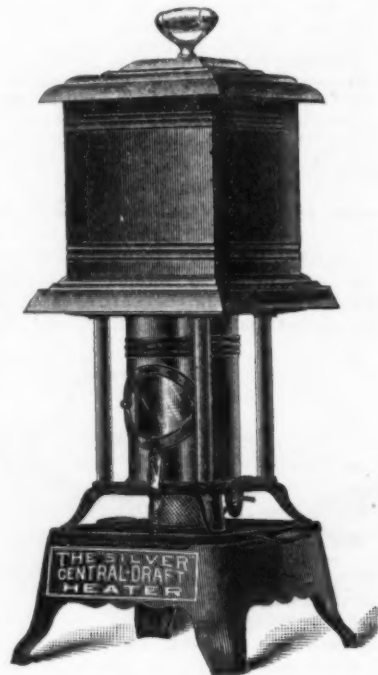


Fig. 3.—Oil Stove with Radiator Attachment.

the manufacturers also use an extension top, which has sufficient room to accommodate three cooking utensils at a time. The top is made of two castings riveted together in such a way as to allow the heat to be diffused throughout the entire surface. The oven employed is of portable form and measures 12½ x 12½ x 11 inches. It is made of heavy tin plate, seam double locked and riveted. It is provided with a cast-iron frame, in which the door tightly fits. It also has a cast iron base to prevent burning out at the bottom, while allowing the oven to rest securely on the top of the stove. A small casting on top of the oven serves as a rest for warming food and at the same time prevents closing the draft of the stove. The oven is double lined and the flues are so arranged, it is stated, as to obtain an even heat in the oven with economy of fuel.

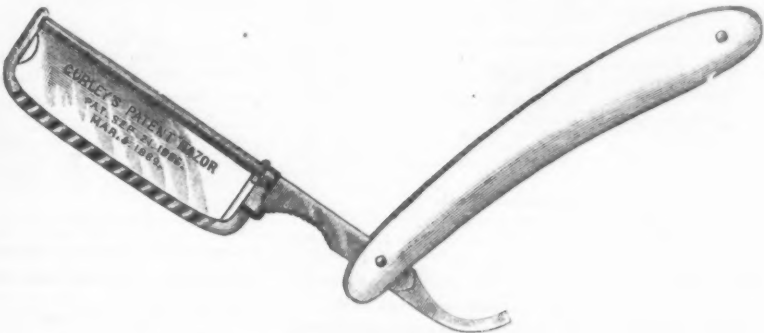
Randolph & Clowes, Waterbury, Conn., call attention to facts of importance regarding the Brown & Bros. patent seamless drawn copper range boiler, manufactured by them. They state that while their boilers of ordinary weight are tested to 200 pounds and the extra heavy to 300 pounds pressure per square inch, they do not warrant them not to burst; but that their boilers are warranted not to collapse. They have known of many of their boilers having been in successful operation under pressure varying from 150 to 200 pounds, for years, some few of these having given out. They recommend their boilers for a service of about one half the

test, thus insuring a fraction of 4, which would appear to be sufficient to satisfy all conservative requirements. They refer to what is often an unrecognized source of trouble—namely, the water hammer to which boilers are subject. They state that the giving out of the boilers is possibly due to the position in which they were placed and the probable near proximity of the discharge cock to the boiler itself, which would develop a greater or less water hammer on the sudden shutting off of the flow of water when drawing. In this connection they also say :

The static pressure of our local water works is 95 pounds. For the purpose of observation we have set up one of our boilers with a pressure gauge attached to one of the top spuds, the inlet pipe being on a direct line from the street main and the boiler forming a sort of dead end. Between the main and the boiler we have a draw-off cock distant about 10 feet from the boiler itself. It is an ordinary bib. When the water has been allowed to run sufficiently long to acquire full velocity, a sudden shutting off develops a hammer of about 35 to 50 per cent., or sometimes more, in excess of the regular static pressure. Under these circumstances it is manifest that even where the public service is light, it is possible to place a boiler in such a position as to develop a ram of very large proportions; in fact, to increase it almost indefinitely.

Reversible Safety Guard Razor.

J. Curley & Bro., 6 Warren street, New York, are offering the trade a razor with a safety guard, as illustrated herewith. The guard is released by pressing on the tang of the razor, turned over and then slid off the back of the razor. This allows the razor to be sharpened. The guard can be taken off or put on the razor in an instant without trouble, and is kept on the razor, except in sharpening. It is neat in appearance and adds no perceptible weight to the razor. Duplicate blades are supplied, which are slid into the back of the razor, replacing the one in use when desired. With this razor it is claimed that persons can shave themselves without danger of being cut, and that the shaving may be done with perfect safety on board the cars, on a steamer, or walking about



Reversible Safety Guard Razor.

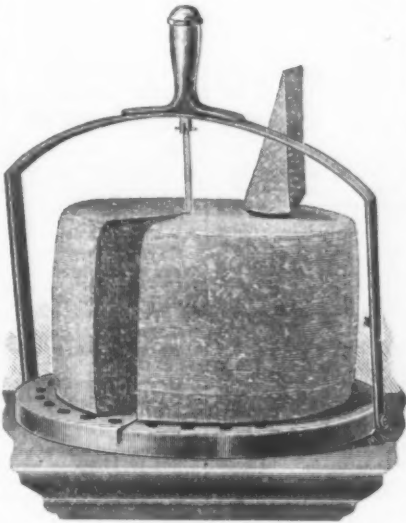
the room. The razors are warranted to be free from imperfections, and each one is numbered so a record may be kept when it was sold and who the purchaser was.

The tin-plate works of Somers Brothers, Third street and Third avenue, Brooklyn, N. Y., which we have occasionally made reference to in the past, are pushing steadily ahead. A great deal of money and labor is being expended on the new buildings, which are now about finished, and the foundations for the machinery are about completed. The firm hope to be manufacturing tin plates about January 1.

Another large dry dock is required at the Brooklyn Navy Yard, those already built not being of sufficient dimensions to receive the new battle ships, which must be provided with armor after they are launched, a year or two hence.

The Always Ready Cheese Cutter.

Meadville Vise Company, Meadville, Pa., are offering the above article, as illustrated herewith. This is made of iron and steel, having all the parts nicked and all the working parts interchangeable. It is simple in construction, having no



The Always Ready Cheese Cutter.

gearing to wind up nor handle to turn, and is referred to as being ornamental to a store. When cutting a whole cheese the bail is laid on the counter with the knife resting in the slot in the base of the cutter, and the cheese is placed on the center of the iron frame. The knife, which has double cutting edges, is then brought to the center of the cheese, the cheese turned to any desired cutting point and the knife drawn downward toward the operator.

The construction of railroads is at about the lowest point. The *Railway Age* says that during nine months, ending Septem-

ber 30, but 2892 miles of new track were laid in the United States, or 950 miles less than in the same period of the sluggish previous year. The *Age* now says the total new mileage this year will fall below 5000 miles. Previous estimates have been about 1000 miles greater. It is probable that there will be a revival of railroad building in the last six months of next year, especially if the 1892 crops are favorable.

The great Pennsylvania oil gusher at McDonald last week yielded as high as 44,000 barrels a day, which is just about half the amount of oil put out in any one day by the celebrated Bradford field. The territory from which this great production comes is not a twelfth the size of the big upper country pool. Such gushers as are now being struck were never known before. Everybody is guessing how long they will last.

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CURRENT HARDWARE PRICES.

OCTOBER 14, 1891

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' Prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers, at the figures named.

Adjusters, Blind.

Domestic..... \$ dos \$3.00, \$3.45
Excelsior..... \$ dos \$10.00, \$10.25
Washington's Self-Locking..... \$20.25, \$20.50

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils.

Eagle Anvil, \$ 10..... \$15.50, \$15.75
Peter Wright's..... \$11.00, \$11.25
Armstrong's Mouse Hole..... \$10.00, \$10.25
Armstrong's Mouse Hole, Extra..... \$12.00, \$12.25
Trenton..... \$10.00, \$10.25
Wilkinson's..... \$10.00, \$10.25
Moore & Barnes Mfg. Co..... \$30.25, \$30.50

Anvil Vise and Drill.

Miller Falls Co., \$18.00..... \$20.25
Cheney Anvil and Vise..... \$25.00, \$25.25
Allen Anvil and Vise, \$3.00..... \$4.00, \$4.25
Star..... \$4.50, \$4.75

Apple Parers—See Parers, Apple, &c.

Augers and Bits.

Douglas Mfg. Co..... \$70.00, \$70.25
Wm. A. Ives & Co..... \$10.00, \$10.25
Humphreysville Mfg. Co..... \$10.00, \$10.25
French, Swift & Co. (F. H. Beecher, P. S. & W. Co.)..... \$10.00, \$10.25
Rockford Bit Company..... \$10.00, \$10.25

Cook's, Douglas Mfg. Co., Auger Bits, \$ set..... \$5.00, \$5.25
Cook's, N. H. Copper Co., \$ set..... \$5.00, \$5.25
Ives' Circular Lip..... \$6.00, \$6.25
Patent Solid Head..... \$3.00, \$3.25

C. E. Jennings & Co., No. 10, extension..... \$4.00, \$4.25

C. E. Jennings & Co., No. 30..... \$5.00, \$5.25

Cook's, N. H. Copper Co., No. 30, \$ set..... \$5.00, \$5.25

Lewis' Patent Single Twist..... \$4.50, \$4.75

Russell Jennings' Augers and Bits..... \$2.50, \$2.75

Imitation Jennings' Bits..... \$6.00, \$6.25

Snell's Jennings Pattern..... \$6.00, \$6.25

Pugh's Black..... \$2.00, \$2.25

Rockford, Jennings' Pattern..... \$6.00, \$6.25

Car Bits, P. S. & W. Co..... \$6.00, \$6.25

Snell's Car Bits..... \$6.00, \$6.25

L. Hommedieu Car Bits..... \$6.00, \$6.25

Forster's Pat. Auger Bits..... \$2.00, \$2.25

Cincinnati Bell-Hangers' Bits..... \$6.00, \$6.25

Bit Stock Drills—

Standard..... \$5.00, \$5.25

Cleveland..... \$5.00, \$5.25

Syracuse, for metal..... \$6.00, \$6.25

Syracuse, for wood (wood list)..... \$6.00, \$6.25

Williams' or Holt's, for metal..... \$6.00, \$6.25

Williams' or Holt's, for wood..... \$4.00, \$4.25

Cincinnati, for wood..... \$6.00, \$6.25

Cincinnati, for metal..... \$6.00, \$6.25

Expansive Bits—

Clark's small, \$1.45; large, \$2.00, \$2.25, \$2.50, \$3.00, \$3.50, \$4.00, \$4.50, \$5.00, \$5.50, \$6.00, \$6.50, \$7.00, \$7.50, \$8.00, \$8.50, \$9.00, \$9.50, \$10.00, \$10.50, \$11.00, \$11.50, \$12.00, \$12.50, \$13.00, \$13.50, \$14.00, \$14.50, \$15.00, \$15.50, \$16.00, \$16.50, \$17.00, \$17.50, \$18.00, \$18.50, \$19.00, \$19.50, \$20.00, \$20.50, \$21.00, \$21.50, \$22.00, \$22.50, \$23.00, \$23.50, \$24.00, \$24.50, \$25.00, \$25.50, \$26.00, \$26.50, \$27.00, \$27.50, \$28.00, \$28.50, \$29.00, \$29.50, \$30.00, \$30.50, \$31.00, \$31.50, \$32.00, \$32.50, \$33.00, \$33.50, \$34.00, \$34.50, \$35.00, \$35.50, \$36.00, \$36.50, \$37.00, \$37.50, \$38.00, \$38.50, \$39.00, \$39.50, \$40.00, \$40.50, \$41.00, \$41.50, \$42.00, \$42.50, \$43.00, \$43.50, \$44.00, \$44.50, \$45.00, \$45.50, \$46.00, \$46.50, \$47.00, \$47.50, \$48.00, \$48.50, \$49.00, \$49.50, \$50.00, \$50.50, \$51.00, \$51.50, \$52.00, \$52.50, \$53.00, \$53.50, \$54.00, \$54.50, \$55.00, \$55.50, 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Clamps—

R. L. Tool Co.'s Wrought Iron.....	25¢
Adjustable, Cincinnati.....	15¢
Adjustable, Hammonds.....	15¢
Adjustable, Stearns.....	30¢
Stearns' Adjustable Cabinet and Corner.....	30¢
Cabinet, Sargent's.....	60¢
Carriage Makers', Sargent's.....	70¢
Carriage Makers', F. S. & W. Co.....	40¢
Eberhard Mfg. Co.....	40¢
Parallels, C. H. Besly & Co.....	25¢
Warner's.....	40¢
Saw Clamps, see Vices, Saw Filers.....	
Carpenters', Cincinnati.....	25¢

Cleaners.

Butchers'.....	
Bradley's.....	25¢
L. & J. White.....	25¢
Beatty's.....	40¢
New Haven Edge Tool Co.'s.....	40¢
F. S. & W. Co.....	30¢
Foster Bros.....	30¢
Schulte, Lohoff & Co.....	40¢

Clips—

Norway, Axle, 1/4 & 5-16.....	55¢
2nd grade Norway Axle, 1/4 & 5-16.....	55¢
Superior Axle Clips.....	60¢
Norway Spring Bar Clips, 5-16.....	60¢
Wrought-Iron Felloe Clips.....	5¢
Steel Felloe Clips.....	5¢
Saker Axle Clips.....	5¢

Cloth and Netting, Wire—See Wire, &c.

Cocks, Brass.

Hardware list.....	50¢
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Coffee Mills—See Mills, Coffee

Collars, Dog, &c.

Medford Fancy Goods Co.....	40¢
Embossed, Gift, Pope & Steven's list.....	30¢
Leather, Pope & Steven's list.....	40¢
Brass, Pope & Steven's list.....	40¢
Chapman Mfg. Company.....	60¢

Combs, Curry.

Fitch's.....	50¢
Rubber, per doz.....	20¢
Perfect.....	50¢
Kellogg's.....	50¢
Sweet & Clark's.....	50¢

Compasses, Dividers, &c.

Compasses, Callipers, Dividers, 70¢ & 10¢	
Bemis & Call Co.'s.....	60¢
Dividers.....	60¢
Compasses & Callipers.....	50¢
Wing and Inside or Outside.....	60¢
Double.....	60¢
(Call's Pat. Inside).....	60¢
Excelsior.....	60¢
J. Stevens & Co.'s.....	60¢
Barrett's.....	60¢
Spring Callipers and Dividers.....	25¢
Lock Callipers and Dividers.....	25¢
Combination Dividers.....	25¢

Coopers' Tools—See Tools, Coopers'.

Cord—

Sash.....	
Common.....	10¢
Patent, good quality.....	12¢
White Cotton Braided, fair.....	12¢
Common Russia Sash.....	12¢
Patent Russia Sash.....	14¢
Cable Laid Italian Sash.....	21¢
India Cable Laid Sash.....	22¢
Silver Lace.....	
A Quality, White, 50¢.....	25¢
B Quality, White, 30¢.....	10¢
C Quality, White, 30¢.....	10¢
Sylvan Spring Extra Braided White, 34¢	
Sylvan Spring Extra Braided White, 39¢	
Patent Idem Braided, White.....	30¢
Egyptian, India Hemp, Braided.....	26¢
Massachusetts, White.....	26¢
Ramson—	
Braided, White Cotton, 50¢.....	30¢
Braided, Drab Cotton, 55¢.....	30¢
Braided, Italian Hemp, 55¢.....	30¢
Braided, Linen, 80¢.....	30¢
Tate's Cotton Braided, White.....	25¢
Wire Picture.....	75¢

Corkscrews—See Screws, Cork.

Cork Knives and Cutters—See

Knives, Cork.

Crackers, Nut—

Table (H. & B. Mfg. Co.).....	40¢
Blake's Pattern.....	40¢
Turner & Seymour Mfg. Co.....	50¢

Cradles—

Grain.....	30¢
White Crayons, gross.....	10¢
D. M. Stewart Mfg. Co., Metal Work.....	25¢
ers, gr. \$2.50.....	25¢
D. M. Stewart Mfg. Co., Rolling Mill.....	25¢
gr. \$2.50.....	25¢

Crown Bars—See Bars, Crown.

Curry Combs—See Combs, Curry.

Curtain Pins—See Pins, Curtain

Cutters—

Meat.....	
Dixon's # dos.....	40¢
Nos.....	1 2 3 4
14.00 17.00 19.00 30.00	
Woodruff's # dos.....	40¢
Nos.....	100 150
15.00 18.00	
Hales Pattern # dos.....	70¢
Nos.....	1 2 3 4
27.00 33.00 45.00	
American.....	30¢
Nos.....	1 2 3 4 5
Each.....	10 15 20 25 30
Enterprise.....	30¢
Nos.....	10 15 20 25 30
Each.....	33 38.50 44 50 55
Great American Meat Cutter.....	30¢
Nos.....	113 116 118 120 122
Each.....	32.00 37.75 43.00 48.50 54.00
Miles' Challenge # dos.....	45¢
Nos.....	1 2 3 4
23.00 30.00 35.00	
Home No. 1.....	20.00 55¢

Draw Cut, each:

Nos. 5 2 6 8	
\$50 \$75 \$80 \$225.....	20¢
Great American.....	30¢
Beef Shavers (Enterprise).....	30¢
Little Giant (F. S. & W. Co.).....	50¢
Chadborn's Smoked Beef Cutter.....	60¢

Tobacco.

Champion.....	30¢
Wood Bottom.....	50¢
All Iron.....	42¢
Nashua Lock Co.'s.....	50¢
Wilson's.....	55¢
Sargent's.....	55¢
Acme.....	40¢

Washer.

Smith's Pat.....	12¢
Johnson's.....	11¢
Penny's.....	11¢
Appleton's.....	16¢
Bonney's.....	10¢
Cincinnati.....	25¢

Dampers, &c.

Dampers, Buffalo.....	40¢
Buffalo Dampers.....	40¢
Crown Dampers.....	40¢
Excelsior.....	40¢

Diggers, Post Hole, &c.

Samson Post Hole Digger.....	38.00
Fletcher Post Hole Augers.....	25¢
Eureka Diggers.....	12.50
Lead's.....	8.00
Vaughan's Post Hole Auger.....	13.00
Kohler's Little Giant.....	18.00
Kohler's Hercules.....	15.00
Kohler's New Champion.....	18.00
Schneider.....	18.00
Ryan's Post Hole Diggers.....	24.00
Cronk's Post Bars.....	80.00
Gibbs Post Hole Digger.....	30.00
Imperial.....	15.00

Dividers—

See Compasses.

Dog Collars—See Collars, Dog, &c.

Door Springs—See Springs, Door.

Drawers.

Money, # dos.....	18¢
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Drawing Knives—See Knives, Drawing.

Drills and Drill Stocks—

Blacksmiths'.....	each \$1.75
Blacksmiths' Self-Feeding.....	each \$7.50
Breast, P. S. & W.....	40¢
Breast, Wilson's.....	30¢
Breast, Millers Falls.....	25¢
Breast, Bartholomew's.....	25¢
Ratchet, Merrill's.....	20¢
Ratchet, Ingersoll's.....	20¢
Ratchet, Parker's.....	20¢
Ratchet, Whitney's.....	20¢
Ratchet, Weston's.....	20¢
Ratchet, Moore's Triple Action.....	20¢
Ratchet, Curtis & Curtis.....	30¢
Whitney's Hand Drill, Plain.....	\$11.00
Adjustable.....	\$12.00
Wilson's Drill Stocks.....	10¢
Automatic Boring Tools.....	\$1.75
Twist Drills—	
Morse.....	50¢
Standard.....	50¢
Syracuse (Metal list).....	50¢
Cleveland.....	50¢
Williams.....	50¢
New Process.....	50¢
Graham's Pat. Groove Shank.....	50¢

Drill Bits—See Augers and Bits.

Drill Chucks—See Chucks.

Dripping Pans—See Pans, Dripping.

Drivers, Screw.

Douglas Mfg. Co.....	30¢
Diston's.....	50¢
Buck Bros.....	30¢
Stanley R. & L. Co.'s.....	65¢
Varished Handles.....	60¢
Sargent & Co.'s.....	60¢
No. 1 Forged Blade.....	60¢
Nos. 20, 30 and 60.....	60¢
P. S. & W.....	70¢
Knapp & Cowles:	
No. 1.....	60¢
No. 2.....	60¢
No. 3.....	60¢
Nos. 4 and 60, Acme and Ideal.....	50¢
Stearns.....	50¢
Gay & Parsons.....	50¢
Champion.....	50¢
Clark's Pat.....	50¢
Crawford's Adjustable.....	50¢
Elkhart's Socket and Hatchet.....	50¢
Allard's Spiral, new list.....	25¢
Kolb's Common Sense.....	25¢
Syracuse Screw-Driver Bits.....	30¢
Screw-Driver Bits.....	50¢
Screw-Driver Bits, Parr's.....	50¢
Fray's Hol. Hds. Sets No. 3.....	12.00
P. D. & Co.'s all Steel.....	50¢
Cincinnati.....	25¢
Brace Screw Drivers.....	25¢
Buck Bros' Screw-Driver Bits.....	50¢

Egg Beaters—See Beaters, Egg.

Egg Poachers—See Poachers, Egg.

Electric Bell Sets—See Bells, Elec-

tric.

Emery.—No. 4 to No. 54 to Flour, CF

Kegs, #.....	15 gr.
1/2 kegs, #.....	5 gr.
1/4 kegs, #.....	5 gr.
1/8 kegs, #.....	5 gr.
10 lb cans, 10.....	5 gr.
In case, 10.....	5 gr.
10 lb cans, less than 10.....	5 gr.

Enamelled and Tinned Ware—

See Ware, Hollow.

Escutcheon Pins—See Pins, Es-

cutcheon.

Escutcheons.

Door Lock..... Same as Door Locks.

Brass Thread..... 60¢

Wood..... 25¢

Expanded Metal.

List No. 5.

Lathing.....	10¢
Fencing, Painted Sheets.....	20¢
Netting, Painted Sheets.....	20¢
Door Mats, Galvanized.....	25¢
Window Guards, Paneled.....	15¢
Tree Guards, Paneled.....	15¢

Extractors, Lemon Juice—See

Squeezers, Lemon.

Fasteners, Blind—

Mackrell's, # dos.....	1.00
Van Sand's Screw Pat., 15¢ gr.....	60¢
Van Sand's Old Pat., 15¢ gr.....	55¢
Washburn's Old Pattern, # gr.....	50¢
Merriman's.....	new list
Austin & Eddy No. 2006 # gr.....	40¢
Security Gravity.....	40¢

Faucets.—

Fenn's.....	40¢
Bohren's Pat. Rubber Ball.....	25¢
Fenn's Cork Stops.....	35¢
Star.....	60¢
Frary's Pat. Petroleum.....	40¢
West's Lock, Open and Shut Key.....	50¢
Star, Metal Plug, new list.....	40¢
Lockport, Metal Plug, reduced list.....	40¢
Metallic Key, Leather Lined.....	60¢
Cork Lined.....	70¢
Burnside's Red Cedar.....	50¢
Burnside's Red Cedar, bbl lots.....	50¢
John Sommers'.....	40¢
Peerless Best Block Tin Key.....	40¢
IXL, 1st quality, Cork Lined.....	50¢
Diamond Lock.....	50¢
Perfection, Fla. Red Cedar.....	50¢
Goodenough Cedar.....	50¢
Boss Metallic Key.....	50¢
Reliable Cork Lined.....	50¢
Western Pattern Cork Lined.....	50¢
Self-Measuring.....	50¢
Enterprise, # dos.....	50¢
Lane's, # Jos.....	50¢
Victor, # dos.....	50¢

Felloe Plates—See Plates, Felloe.

Fifth Wheels—

Derby and Cincinnati.....	45¢
Brewster.....	50¢

Files—

Domestic—

Nicholson Files, Rasps, &c.....	60¢
Nicholson (X. F.) Files.....	25¢
Nicholson's Royal Files (Seconds).....	75¢
(extra prices on certain sizes)	
G. & H. Barnett (Black Diamond).....	10¢

Eagle.....

60¢	10¢	10¢	10¢
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Other makers, best brands.....

60¢	10¢	10¢	10¢
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Fair brands.....

60¢	10¢	10¢	10¢
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Second quality.....

70¢	10¢	10¢	10¢
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Heller's Horse Rasps.....

60¢	10¢	10¢	10¢
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McCaffrey's Horse Rasps.....

60¢	10¢	10¢	10¢
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Chesapeake Horse Rasps, Hand Cut.....

60¢	10¢	10¢	10¢
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Moss & Gamble.....

List, April 1, 1883, 15¢	
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Butcher.....

Butcher's list, 20¢	
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Stubs.....

Stubs list, 25¢	
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Turton's.....

Turton's list, 20¢	
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Greaves' Horse Rasps, American list, 60¢

Fixtures.

Grindstone—

Sargent's Patent.....	70¢
Reading Hardware Co.....	30¢
P. S. & W. Co.....	60¢

Fluting Machines—See Machines, Fluting.

Fluting Scissors—See Scissors, Fluting.

Fodder Squeezers—See Squeezers, Fodder.

Forks—

Hay, Manure, &c., Also List.....	65¢
Hay, Manure, &c., Phila. List.....	60¢
Plated, see Spoons.....	

Frames—

Saw—

White Vermont.....	gr \$0.00
Red, Polished and Varnished.....	1.50

Screens, Window and Door Frame.

Porter's Pat. Window and Door Frame.....	83¢
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Warner's Screen Corner Irons.....

33¢	
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Stearns' Frames and Corners.....

25¢	
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Cortland.....

40¢	
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Freezers, Ice Cream—

Kohler's Hercules.....	7 doz. 15.00
Kohler's New Champion.....	7 doz. \$9.00

Hangers—

Barn Door, old patterns.....	60¢10¢10¢70¢
Barn Door, New England.....	60¢10¢10¢70¢
Samson Steel Anti-Friction.....	55¢
Orleans Steel.....	55¢
Hamilton Wrought Wood Track.....	55¢
U. S. Wood Track.....	55¢
Champion.....	60¢10¢
Bilder and Wooster, Medina Mfg. Co.'s List.....	70¢
Climax Anti-Friction.....	65¢
Climax Anti-Friction for Wood Track.....	65¢
Zenith for Wood Track.....	55¢
Need's Steel Arm.....	50¢
Challenge, Barn Door.....	50¢
Stirling.....	50¢50¢10¢
Victor, No. 1, \$15.00; No. 2, \$10.00; No. 3, \$18.00.....	50¢25¢
Cheritree.....	50¢10¢
Kidder's.....	50¢10¢60¢
Boss.....	60¢10¢
Best Anti-Friction.....	60¢10¢
Duplex (Wood Track).....	60¢10¢55¢
Terry's Pat., 7 dos pr. 4 in., \$10.00; 5 in., \$12.00.....	50¢10¢
Terry's Steel Anti-Friction Leader.....	50¢10¢
Terry's Steel Anti-Friction Ideal.....	50¢10¢
Cronk's Patent, Steel Covered.....	60¢5¢
Wood Track Iron Clad, 4 ft. 10 in.....	60¢

Carrier Steel Anti-Friction.....	\$15.00
Architect, 7 set \$6.00.....	20¢
McClips.....	20¢10¢
Felix, 7 set \$4.50.....	20¢
Richards.....	30¢20¢10¢
Lane's Standard.....	50¢50¢10¢
Lane's New Standard.....	50¢50¢10¢
Lane's Parlor.....	40¢
Mail Bearing Door Hanger.....	20¢10¢25¢10¢
Warner's Pat.....	20¢10¢20¢10¢10¢
Stearns' Anti-Friction.....	20¢10¢20¢10¢10¢
Stearns' Challenge.....	25¢10¢25¢10¢10¢
Faultless.....	40¢40¢5¢
American, 7 set \$6.00.....	50¢10¢
Rider & Wooster, No. 1, 62¢; No. 2, 75¢.....	40¢
Paragon, Nos. 1, 2 and 3.....	40¢10¢
Cincinnati.....	25¢10¢
Paragon, Nos. 5, 5 1/2, 7 and 8.....	20¢10¢
Crescent.....	60¢60¢10¢
Nickel Cast Iron.....	50¢
Nickel Malleable Iron and Steel.....	40¢
Scranton Anti-Friction Single Strap.....	35¢
Wild West, 4 in. Wheel, 15.00; 5 in. Wheel, \$21.00.....	45¢
Star.....	40¢10¢40¢10¢5¢
May.....	50¢50¢60¢10¢
Barry, \$6.00.....	40¢10¢
Interstate.....	60¢
Magic.....	40¢

Harness Snaps—See Snaps.

Hatchets—

American Axe and Tool Co.	
Blood's.....	60¢10¢
Hunt's.....	60¢10¢
Hurd's.....	70¢2¢
Mann's.....	60¢
Peck's.....	60¢
Underhill's.....	40¢10¢
Buffalo Hammer Co.....	40¢
Fayette R. Plumb.....	50¢5¢
C. Hammond & Son.....	50¢5¢
Kelly's.....	50¢5¢
Sargent & Wooster, No. 1, 62¢; No. 2, 75¢.....	40¢
P. S. & W. Co.....	10¢
Ten Eyck Edge Tool Co.....	10¢
Collins.....	10¢
Schulte, Lohoff & Co.....	50¢50¢55¢

Hay and Straw Knives—See

Knives.

Hinges—

Blind Hinges—

Parker.....	75¢2¢
Palmer.....	70¢2¢
Seymour.....	70¢2¢
Huffer.....	60¢
Clark's, Nos. 1, 3, 5, 40 and 60.....	75¢10¢5¢90¢
Clark's Morris Gravity.....	75¢10¢5¢90¢
Sargent's Nos. 1, 3, 5, 1, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100.....	75¢10¢55¢10¢55¢
Sargent's, No. 12.....	77¢10¢10¢
Reading's Gravity.....	75¢10¢75¢10¢55¢
Shepard's.....	75¢10¢
Noiseless.....	75¢10¢
Nigara.....	80¢
Buffalo.....	80¢
Clark's Genuine Patent.....	80¢
O. S. Lull & Porter.....	75¢10¢
Acme, Lull & Porter.....	75¢
Queen City Reversible.....	70¢10¢5¢75¢
Clark's Lull & Porter, Nos. 0, 1, 1 1/2, 2, 2 1/2, 3, 3 1/2, 4, 4 1/2, 5, 5 1/2, 6, 6 1/2, 7, 7 1/2, 8, 8 1/2, 9, 9 1/2, 10, 11, 12, for Wood, \$9.00; No. 3, for brick, \$11.50.....	10¢

Gate Hinges—

Western.....	7 dos \$4.40, 60¢
N. E.....	7 dos \$7.00, 55¢
F. E. Reversible.....	7 dos \$5.20, 55¢10¢
Clark's, Nos. 1, 2, 3.....	60¢10¢55¢
V. V. State.....	7 dos \$5.00, 55¢10¢
Automatic.....	7 dos \$13.50, 50¢
Common Sense.....	7 dos \$4.50, 50¢
Seymour's.....	45¢10¢
Shepard's.....	60¢10¢55¢
Need's Latch and Hinges.....	7 dos \$12.00, 60¢

Spring Hinges—

Geer's Spring and Blank Butts.....	40¢
Union Spring Hinge Co.'s List, March 1891.....	40¢
Acme.....	30¢
O. S.....	25¢10¢
Empire and Crown.....	20¢
Hero and Monarch.....	20¢
American, Gem, and Star.....	20¢
Oxford.....	20¢
Barker's Double Acting.....	25¢
Union Mfg. Co.....	25¢
Bommer's.....	30¢
Buckman's.....	15¢20¢
Chicago.....	30¢
Wiles.....	10¢
Devore's.....	40¢
Re.....	40¢
Royal.....	60¢
Reliable.....	60¢
Champion.....	60¢
Bardley's Patent.....	40¢
Stearns.....	50¢10¢
Niagara, Holdback pattern, per gross.....	\$14.00

Wrought Iron Hinges

List February 14, 1891.....	50¢10¢
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Corrugated Strap and T.....	50¢10¢
Screw Hook and 1/4 in. 6 to 12 in., 7/8 in., Strap.....	14 to 20 in., 7/8 in., 3/4 in., 22 to 36 in., 7/8 in., 3/4 in., 1/2 in., 7/8 in., 3/4 in., 1/4 in., 7/8 in., 3/4 in., 1/8 in., 7/8 in., 3/4 in., 1/16 in., 7/8 in., 3/4 in., 1/32 in., 7/8 in., 3/4 in., 1/64 in., 7/8 in., 3/4 in., 1/128 in., 7/8 in., 3/4 in., 1/256 in., 7/8 in., 3/4 in., 1/512 in., 7/8 in., 3/4 in., 1/1024 in., 7/8 in., 3/4 in., 1/2048 in., 7/8 in., 3/4 in., 1/4096 in., 7/8 in., 3/4 in., 1/8192 in., 7/8 in., 3/4 in., 1/16384 in., 7/8 in., 3/4 in., 1/32768 in., 7/8 in., 3/4 in., 1/65536 in., 7/8 in., 3/4 in., 1/131072 in., 7/8 in., 3/4 in., 1/262144 in., 7/8 in., 3/4 in., 1/524288 in., 7/8 in., 3/4 in., 1/1048576 in., 7/8 in., 3/4 in., 1/2097152 in., 7/8 in., 3/4 in., 1/4194304 in., 7/8 in., 3/4 in., 1/8388608 in., 7/8 in., 3/4 in., 1/16777216 in., 7/8 in., 3/4 in., 1/33554432 in., 7/8 in., 3/4 in., 1/67108864 in., 7/8 in., 3/4 in., 1/134217728 in., 7/8 in., 3/4 in., 1/268435456 in., 7/8 in., 3/4 in., 1/536870912 in., 7/8 in., 3/4 in., 1/1073741824 in., 7/8 in., 3/4 in., 1/2147483648 in., 7/8 in., 3/4 in., 1/4294967296 in., 7/8 in., 3/4 in., 1/8589934592 in., 7/8 in., 3/4 in., 1/17179869184 in., 7/8 in., 3/4 in., 1/34359738368 in., 7/8 in., 3/4 in., 1/68719476736 in., 7/8 in., 3/4 in., 1/137438953472 in., 7/8 in., 3/4 in., 1/274877906944 in., 7/8 in., 3/4 in., 1/549755813888 in., 7/8 in., 3/4 in., 1/1099511627776 in., 7/8 in., 3/4 in., 1/2199023255552 in., 7/8 in., 3/4 in., 1/4398046511104 in., 7/8 in., 3/4 in., 1/8796093022208 in., 7/8 in., 3/4 in., 1/17592186044416 in., 7/8 in., 3/4 in., 1/35184372088832 in., 7/8 in., 3/4 in., 1/70368744177664 in., 7/8 in., 3/4 in., 1/140737488355328 in., 7/8 in., 3/4 in., 1/281474976710656 in., 7/8 in., 3/4 in., 1/562949953421312 in., 7/8 in., 3/4 in., 1/1125899906842624 in., 7/8 in., 3/4 in., 1/2251799813685248 in., 7/8 in., 3/4 in., 1/4503599627370496 in., 7/8 in., 3/4 in., 1/9007199254740992 in., 7/8 in., 3/4 in., 1/18014398509481984 in., 7/8 in., 3/4 in., 1/36028797018963968 in., 7/8 in., 3/4 in., 1/72057594037927936 in., 7/8 in., 3/4 in., 1/144115188075855872 in., 7/8 in., 3/4 in., 1/288230376151711744 in., 7/8 in., 3/4 in., 1/576460752303423488 in., 7/8 in., 3/4 in., 1/1152921504606846976 in., 7/8 in., 3/4 in., 1/2305843009213693952 in., 7/8 in., 3/4 in., 1/4611686018427387904 in., 7/8 in., 3/4 in., 1/9223372036854775808 in., 7/8 in., 3/4 in., 1/18446744073709551616 in., 7/8 in., 3/4 in., 1/36893488147419103232 in., 7/8 in., 3/4 in., 1/73786976294838206464 in., 7/8 in., 3/4 in., 1/147573952589676412928 in., 7/8 in., 3/4 in., 1/295147905179352825856 in., 7/8 in., 3/4 in., 1/590295810358705651712 in., 7/8 in., 3/4 in., 1/1180591620717411303424 in., 7/8 in., 3/4 in., 1/2361183241434822606848 in., 7/8 in., 3/4 in., 1/4722366482869645213696 in., 7/8 in., 3/4 in., 1/9444732965739290427392 in., 7/8 in., 3/4 in., 1/18889465931478580854784 in., 7/8 in., 3/4 in., 1/37778931862957161709568 in., 7/8 in., 3/4 in., 1/75557863725914323419136 in., 7/8 in., 3/4 in., 1/151115727451828646838272 in., 7/8 in., 3/4 in., 1/302231454903657293676544 in., 7/8 in., 3/4 in., 1/604462909807314587353088 in., 7/8 in., 3/4 in., 1/1208925819614629174706176 in., 7/8 in., 3/4 in., 1/2417851639229258349412352 in., 7/8 in., 3/4 in., 1/4835703278458516698824704 in., 7/8 in., 3/4 in., 1/9671406556917033397649408 in., 7/8 in., 3/4 in., 1/19342813113834066795298816 in., 7/8 in., 3/4 in., 1/38685626227668133590597632 in., 7/8 in., 3/4 in., 1/77371252455336267181195264 in., 7/8 in., 3/4 in., 1/154742504910672534362390528 in., 7/8 in., 3/4 in., 1/309485009821345068724781056 in., 7/8 in., 3/4 in., 1/618970019642690137449562112 in., 7/8 in., 3/4 in., 1/1237940039285380274899244224 in., 7/8 in., 3/4 in., 1/2475880078570760549798488448 in., 7/8 in., 3/4 in., 1/4951760157141521099596976896 in., 7/8 in., 3/4 in., 1/9903520314283042199193953792 in., 7/8 in., 3/4 in., 1/19807040628566084398387907584 in., 7/8 in., 3/4 in., 1/39614081257132168796775815168 in., 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Walters. 30x10x20x10x10x
Hickory..... 30x10x20x10x10x
Lignumvite..... 30x10x20x10x10x
H. & L. Block Co., Hickory & L. V.
30x30x10x

Wattles. Regular list.
60x10x60x10x10x

Measures.
Standard Fiberglass, No. 1, peck, 7
dosen, 4: 1/2 peck, \$3.50.

Meat Cutters. See Cutters, Meat.

Menders, Harness.

Per do......\$2.00

Mills.

Coffee.

Box and Side, List Jan. 1, 1888..... 60x2x

American, Enterprise Mfg. Co. 30x10x10x10x

The Swift, Lane Bros..... 30x10x

Mining Knives. See Knives, Mining.

Molasses Gates. See Gates, Molasses.

Money Drawers. See Drawers, Money.

Mowers, Lawn.

Pennsylvania New Model, Excelsior,
Continental, &c..... 60x60x5x

Philadelphia..... 60x10x

Perfection..... 60x10x

Easy..... 60x10x60x10x5x

Day Star..... 60x10x60x10x5x

Other Machines..... 60x10x5x70x

Muzzles.

Safety...... 7 dos, \$3.00, 35 x

Nails.

Cut and Wire. See Trade Report.

Wire Nails, Papered.

Association list, July 15, '89, 75x10x80x

Tack Mfrs.' list..... 70x70x10x

Wire Nails, Standard Penny..... 70x70x10x

Card June 1 '89 base..... \$2.10 @ \$2.20

Horse.

Nos. 6 7 8 9 10

Available..... 23x23x23x23x23x

Clinton, Fin. 19x17x16x15x14x..... 30x

Essex..... 23x23x23x23x23x

Lynn..... 19x17x16x15x14x..... 30x

Snowden..... 19x17x16x15x14x..... 30x

Putnam..... 23x21x20x19x18x..... 30x

Vulcan..... 23x21x20x19x18x..... 30x

Northwestern..... 23x21x20x19x18x..... 30x

Globe..... 23x21x20x19x18x..... 30x

Boston..... 23x21x20x19x18x..... 30x

A. C..... 23x21x20x19x18x..... 30x

O. B. K..... 23x21x20x19x18x..... 30x

Maud S..... 23x21x20x19x18x..... 30x

Champion..... 23x21x20x19x18x..... 30x

Saranac..... 23x21x20x19x18x..... 30x

Champion..... 23x21x20x19x18x..... 30x

Capwell..... 23x21x20x19x18x..... 30x

Star..... 23x21x20x19x18x..... 30x

Anchor..... 23x21x20x19x18x..... 30x

Western..... 23x21x20x19x18x..... 30x

Empire Broomed..... 14 x 10

Picture.

Brass Head, Sargent's list..... 50x10x10x

Brass Head, Combination list..... 50x10x

Porcelain Head, Sargent's list..... 50x10x10x

Porcelain Head, Combination list..... 50x10x10x

Niles' Patent..... 40x

Nail Pullers. See Pullers, Nail.

Nail Sets. See Sets, Nail.

Nut Crackers. See Crackers, Nut.

Nuts. List Dec. 18, 1889.

Hot Pressed..... Square, Hex.

Cold Punched..... 5.00x 6.00x off list.

In packages of 100 lb, add 1-100 lb, add

1/2 lb, net; in packages less than 100 lb, add

1/2 lb, net.

Oakum.

Best or Government..... 7x7x7x

U. S. Navy..... 7x7x7x

Navy..... 7x7x7x

Others.

Zinc and Tin..... 66x10x70x

Brass and Copper..... 60x10x50x10x5x

Malleable, Hammers, Improved, No. 1,

\$3.50; No. 2, \$4.00; No. 3, \$4.50. 70x

Malleable, Hammers, Old Pattern, same

list..... 10x10x5x

Prior's Pat. or "Paragon" Zinc..... 60x10x10x

Prior's Pat. or "Paragon" Brass..... 60x10x10x

Olstead's Tin and Zinc..... 60x10x10x

Olstead's Brass and Copper..... 60x10x10x

Broughton's Zinc..... 60x10x10x

Broughton's Brass..... 60x10x10x

Jem P. D. & Co..... 70x

Steel, Draper and Williams..... 60x

Openers, Can.

Messenger's Comet..... 7 dos \$3.00, 25x

American..... 7 gross \$3.00

Duplex..... 7 dos \$3.75, 20x

Lyman's..... 7 dos \$2.25, 55x60x

No. 5, Iron Handle..... 7 dos \$6.00, 45x60x

Bureau..... 7 dos \$3.50, 10x

Sardine Scissors..... 7 dos \$3.75x3.0x

Star..... 7 dos \$3.75

Sprague, No. 1, \$2.00, 2, \$2.25..... 50x10x10x

Excelsior No. 1 \$3.50; No. 2, \$3.50..... 40x

World's Best..... 7 gross, No. 1, \$12.00; No. 2, \$24.00; No. 3, \$36.00..... 50x10x

Universal..... 7 dos \$3.00..... 45x55x

Domestic..... 7 dos \$3.50..... 45x

Champion..... 7 dos \$3.00..... 55x

Packing, Steam.

Standard..... 80x5x65x

Extra..... 50x50x55x

N. Y. B. & P. Co., Standard..... 50x

N. Y. B. & P. Co., Empire..... 90x

N. Y. B. & P. Co., Salamander..... 25x

Jenkins' Standard..... 70x, 25x25x55x

Miscellaneous.

American Packing..... 10x10x10x

Russian Packing..... 14x

Asian Packing..... 13x14x

Cotton Packing..... 15x17x

Jute..... 7x8x

Padlocks. See Locks.

Pails.

Galvanized Iron.

Quarts 10 12 14

Hill's Light Weight, 7 dos, \$2.75, 3.00, 3.25

Hill's Heavy Weight, 7 dos, 3.00, 3.25, 3.75

Helwig's..... 2.50, 2.75, 3.00

Sidney Shepard & Co..... 2.35, 2.55, 3.05

Iron Clad..... 2.50, 2.75, 3.00

Fire Buckets..... 2.75, 3.25, 3.50

Buckets, see Well Buckets.

Indurated Fibre Ware.—35 x

Star Pails, 12 qt..... 7 dos \$5.40

Stable and Milk, 14 qt..... 7 dos \$6.10

Fire Pails, 12 qt..... 7 dos \$5.40

round bottom..... 7 dos \$5.40

Standard Fibre Ware.

Water Pails, 12 qt, per dos, \$4.00

Dairy Pails, 14 qt, per dos, 4.50

Fire Pails, No. 1, 12 qt, per dos, 4.50

Fire Pails, No. 2, 14 qt, per dos, 5.00

Sugar Pails..... 6.00, 6.50

Horse Pails..... 5.00

Buggy Pails..... 4.00

Slop Jars (bal. trap)..... 9.00

Chamber Pails, 14 qt..... 6.50, 7.50

Pans.

Dripping.

Small sizes..... 7 dos \$6.40

Large sizes..... 7 dos \$6.40

Silver & Co. (Covered)..... 40x

Fry.

Standard List:

No..... 0 1 2 3 4

7 dos, \$3.00, \$3.75, \$4.25, \$4.75, \$5.25

No..... 5 6 7 8

7 dos, \$5.00, \$7.00, \$8.00, \$9.00

Polished, regular goods..... 75x75x10x

Acme Fry Pans..... 60x10x

Dust.

Steel Edge, No. 1..... 7 dos \$1.75

Paper and Cloth.

List April 19, 1886..... 50x50x10x

Sibley's Emery and Crocus Cloth..... 30x

Parers.

Apple.

Advance..... 7 dos \$4.75

Baldwin..... 7 dos 5.25

Bonanza..... each 5.00

Daisy..... 7 dos 5.00

Dandy..... each 7.50

Eclipse..... 7 dos 4.25

Eureka, 1888..... each 16.00

Family Bay State..... 7 dos 12.00

Favorite..... 7 dos 5.00

Gold Medal..... 7 dos 4.00

Ideal..... 7 dos 5.00

Improved Bay State..... 7 dos \$7.00 @ 30.00

Little Star..... 7 dos 4.50

Monarch..... 7 dos 13.50

New Lightning..... 7 dos 5.50

Orion..... 7 dos 4.00

Penn..... 7 dos 4.00

Perfection..... 7 dos 4.00

Pomona..... 7 dos 4.00

Rocking Table..... 7 dos 6.00

Turn Table..... 7 dos 4.50

Victor..... 7 dos 13.50

Waverly..... 7 dos 4.00

White Mountain..... 7 dos 4.00

78..... 7 dos 7.00

Potato.

White Mountain..... 7 dos \$4.50

Antrim Combination..... 7 dos \$5.50

Hoosier..... 7 dos \$13.50

Saratoga..... 7 dos \$5.50

Pencils.

Faber's Carpenters'..... high list 50x

Round Gill..... 7 dos \$5.25

Dixon's Lead..... 7 dos \$4.50

Dixon's Lumber..... 7 dos \$6.75

Dixon's Carpenters'..... 10x

Picks.

Railroad or Adas Eye, 5 to 6, \$12.00;

6 to 7, \$13.00..... 60x10x60x10x5x

Picture Nails. See Nails, Picture.

Pinking Irons. See Irons, Pinking.

Pins.

Box.

Humason, Beckley & Co's..... 60x10x

Sargent & Co's..... 17 and 18..... 60x10x

Peck, Stow & W Co..... 50x10x50x10x5x

Curtain.

Silvered Glass..... not

White Enamel..... not

Acutecheon..... not

Iron, list Nov. 11, 1886..... 50x10x50x10x5x

Brass..... 60x10x5x

Pipe, Wrought Iron.

List September 18, 1889.

1 1/2 and under, Plain..... 57x6

1 1/2 and under, Galvanized..... 47x6

1 1/2 and over, Plain..... 67x6

1 1/2 and over, Galvanized..... 55x6

Boiler Tubes.....

Sizes up to 2 1/2 in. inclusive..... 55x

Sizes 3 to 6 in. inclusive..... 65x

Sizes 7 in. and up..... 65x

Casing..... 50x

Steel Boiler Tubes..... 30x

Planes and Plane Irons.

Wood Planes.

Molding..... 40x10x

Beach, First Quality..... 50x10x

Beach, Second Quality..... 55x10x

Galley's (Stanley R. & L. Co.)..... 40x10x

Iron Planes.

Bailey's (Stanley R. & L. Co.)..... 40x10x40x10x10x

Miscellaneous Planes (Stanley R. & L. Co.)..... 20x10x20x10x10x

Victor Planes (Stanley R. & L. Co.)..... 20x10x20x10x10x

Steer's Iron Planes..... 25x35x10x

Meriden Iron Co's..... 40x40x10x

Back Saws—		Shaves, Spoke		Skins, Thimble—		Stocks and Dies—	
Griffin's, complete.....	40&10&50	Wood.....	45	Western Hat.....	75&10&15	Blacksmith's.....	10&40&10
Griffin's Hack Saw, Blades.....	40&10&50	Wood Cast, at factory.....	30	Columbus Wrl. Steel, Special net prices.....	60	Waterford Goods.....	40&40&10
Star Hack Saws and Blades.....	25	Bailey's (Stanley R. & L. Co.).....	40&10	Coldbrookdale Iron Co.....	60	Butterfield's Goods.....	40&40&10
Eureka and Crescent.....	25	Stearns.....	30&10	Seneca Falls Pattern.....	60	Lightning Screw Plate.....	25&30
Scroll—		Cincinnati.....	25&10	Utica P. S. T. Skins.....	60	Reese's New Screw Plates.....	35&40&50
Lester, complete, \$10.00.....	25	Goodell's, \$ dos \$9.00.....	25	Utica Turned and Fitted.....	35	Reversible Hatchet.....	30
Rogers, complete, \$4.00.....	25	Shears—		Slates—		Gardner.....	25
Barnes' Builders' and Cabinet Makers', \$15.....	25	American (Cast) Iron.....	75&10&15	School, by case.....	50&10&50&10&10	Stops, Bench.	
Barnes' Scroll Saw Blades.....	25	Barnard's Lamp Trimmers.....	\$ dos \$3.75	Snaps, harness, &c.—		Morrill's.....	\$ dos \$0.50
Saw Frames—See Frames, Saw.		Tinners'.....	20&25	Anchor (T. & S. Mfg. Co.).....	65	Hotchkiss's.....	\$ dos \$5.10&10&10
Saw Sets—See Sets, Saw.		Seymour's, List, Dec., 1891.....	20&25	Fitch's (Bristol).....	60&10	Weston's, No. 1, \$10; No. 2, \$9.25.....	10&10&10
Saw Tools—See Tools, Saw.		Heinrich's, List, Dec., 1891.....	60&10&10&60&10&10&25	Hotchkiss.....	10	McGill's.....	\$ dos \$3.....10
Scales—		Heinrich's Tailor's Shears.....	35	Andrews.....	50	Cincinnati.....	35&10
Hatch, Counter, No. 171, good quality, \$ dos \$21.00.....	25	Cast Steel Trimmers.....	35	Sagen's Patent Guarded.....	70&10&10	Stone—	
Hatch, Tea, No. 161.....	\$ dos \$2.00	First quality.....	80&80&10	German, new list.....	40&10	Hindustan No. 1, 3¢; Are, 8¢; Slips No. 1, 4¢.....	25
Union Platform, Plain.....	\$2.10&2.50	Second quality.....	80&10&80&10&10	Covert.....	50&10&5&25	Sand Stone.....	\$ dos \$2
Union Platform, Striped.....	\$2.40&2.50	Acme Cast Shears.....	10&10	Covert, New Patent.....	50&10&5&25	Washita Stone, Extra.....	\$ dos \$2&25
Chattillon's Grocers' Trip Scales.....	50	Diamond Cast Shears.....	10	Covert, New R. E.....	60&10&5&25	Washita Stone, No. 1.....	\$ dos \$1.20&25
Chattillon's Eureka.....	25	Clippers.....	10	Covered Spring.....	60&10&10	Washita Stone, No. 2.....	\$ dos \$1.35
Chattillon's Favorite.....	40	Howe Bros. & Hulbert, Solid Forged Steel.....	40	Snaths, Scythe.		Washita Slips, No. 1, Extra.....	\$ dos \$4&45
Family, Turnbills.....	30&30&10	Chicago Drop Forge & F. Co., Solid Steel Forged.....	60	List.....	50	Washita Slips, No. 1.....	\$ dos \$3&35
Riehle Bros.' Platform.....	40	Davenport Cutlery Co.....	60&60&10	Soldering Irons—See Irons, Soldering.		Arkansas Stone, No. 1, 4 to 6 in.....	\$ dos \$1.50
Scale Beams—See Beams, Scale.		Clausen Shear Co., Japaned.....	70	Spittoons, Cuspidors, &c.—		Arkansas Stone, No. 1, 6 to 8 in.....	\$ dos \$1.85
Scissors, Fluting.....		Clausen Shear Co., Nickelplated, same list.....	70	Standard Fiberglass.....		Turkey Oil Stone, 4 to 8 in.....	\$ dos \$4
Scrapers—		Galvanic, 3/4 to 9 in, \$ dos, \$1.00 per inch.....	40	Cuspidors, 8 1/2-inch, \$ dos., No. 5, \$8; No. 5X \$9.....		Turkey Slips.....	\$ dos \$1.00&1.30
Adjustable Box Scraper (B. R. & L. Co.) \$6.50.....	30&40	Pruning Shears and Hooks.		Spittoons, Daisy, 8-inch, No. 1, \$4; 10 and 11 inch, \$6.....		Lake Superior, Chase.....	\$ dos \$1.35
Box, 1 Handle.....	\$ dos \$4.00, 10	Diston's Combined Pruning Hook and Saw.....	\$ dos \$18.00, 20&10	Speke Shaves—See Shaves, Spoke.		Lake Superior Slips, Chase.....	\$ dos \$2
Box, 2 Handle.....	\$ dos \$6.00, 10	Diston's Pruning Hook.....	\$ dos \$12.00, 20	Spoke Trimmers—See Trimmers, Spoke.		Seneca Stone, Red Paper Brand.....	\$ dos \$18&20
Defiance Box and Ship.....	30&10	E. S. Lee & Co's Pruning Tools.....	40	Speke Trimmers—See Trimmers, Spoke.		Seneca Stone, High Rounds.....	\$ dos \$0.25
Foot.....	50&10&60	Pruning Shears, Henry's Pat.....	\$ dos \$4.00	Spoons and Forks—		Seneca Stone, Small Whets.....	\$ gro \$24.00
Ship, Common.....	\$ dos \$3.50 and 10	Henry's Pruning Shears.....	\$ dos \$4.25	Tinned Iron—		Steve Polish—See Polish, Steve.	
Ship, R. I. Tool Co.....	10	Wheeler, M. & C. Co's Combination.....	4.50	Basting, Cen. Stamp Co's list.....	70&10	Stretchers, Carpet.	
Screen Window and Door Frames—See Frames.		Dunlap's Saw and Chisel.....	\$ dos \$8.50, 30	Solid Table and Tea, Cen. Stamp Co's list.....	70&10	Cast Iron, Steel Points.....	\$ dos \$2.25
Screw Drivers—See Drivers, Screw.		J. Mallinson & Co., No. 1, \$5.25; No. 2, 7.25.....	30	Buffalo S. S. & Co.....	33&42	Socket.....	\$ dos \$1.75
Screws.		P. S. & W. Co.....	60	Silver-Plated—(4 mos. or 5¢ cash 30 days).....		Gullard's.....	25&35&10
Bench and Hand—		Tinners', &c.—		Meriden Brit. Co., Rogers.....	40&15	Strops, Razor—	
Bench, Iron.....	55&10&55&10&10	Shears and Snips (P. S. & W.).....	30&35	C. Rogers & Bros.....	40&15	Genuine Emerson.....	60&80&55
Bench, Wood, Beech.....	\$ dos \$2.25	Snips, J. Mallinson & Co.....	33&45	Rogers & Bro.....	40&15	Imitation.....	\$ dos \$2.00, 30&10&55
Bench, Wood, Hickory.....	20&10	Sheaves—		Reed & Barton.....	40&40&55	Torrey's.....	\$ dos \$2.00
Hand, Wood.....	55&10&55&10&55	Sliding Door.....		Wm. Rogers Mfg. Co.....	40, 15&55	Badger's Belt and Com.....	\$ dos \$2.00
Lag, Blunt Point, List Jan. 1, 1890, 75&10	25	M. W. Co., list July, 1888.....	60&10&60&5	Simpson, Hall, Miller & Co.....	40, 15&55	Lamont Combination.....	\$ dos \$4.00
Coach and Lag, Gimlet Point, List Jan. 1, 1890.....	75&75&10	R. & E., list Dec. 18, 1888.....	55&20	Robins & Edwards Silver Co.....	40, 15&55	Jordan's Pat. Padded, list Nov. 1, 1890.....	\$ dos \$1.80
Bed.....	25&55	Corbin's.....	60&10&25	L. Boardman & Son.....	50&12&5	Electric.....	list not
Hand Rail, Sargent's.....	65&40	Patent Roller, Hatfield's.....	75	Miscellaneous.		Stuffers or Fillers, Sausage—	
Hand Rail, H. & F. Mfg. Co.....	70&10&75	Russell's Anti-Friction, list Dec. 18, 1888.....	60&25	Holmes & Edwards Silver Co.: No. 67 Mexican Silver.....	60&10&55	Miles' "Challenge," \$ dos \$20, 50¢.....	\$ dos \$2.00
Hand Rail, Am. Screw Co.....	75	Muore's Anti-Friction.....	50	No. 80 Silver Metal.....	50&10&55	Perry.....	\$ dos \$15.00, 30
Jack Screws, Millers Falls list.....	60&60	Sliding Shutter.....		No. 24 German Silver.....	50&10&55	\$21.00.....	50&50&10
Jack Screws, P. S. & W.....	60&10&60&10	R. & E. list Dec. 18, 1888.....	60&10&25	No. 50 Nickel Silver.....	50&55	Draw Cut No. 4, each \$30.00.....	30
Jack Screws Sargent.....	60&10&60&10&55	Sargent's list.....	60&10	No. 49 Nickel Silver.....	50&10&55	Enterprise Mfg. Co.....	20&10&30
Jack Screws Stearns.....	40&40&10	Reading list.....	60&10&10	Wm. Rogers Mfg. Co.....	50, 10&55	Silver's.....	40&10
Corb—		Shells—		Rogers' Silver Metal.....	50, 10&55	Sweepers, Carpet.	
Humason & Beckley Mfg. Co.....	40&10&50	First quality 4, 8, 10 and 12 gauge.....	25&10&25	25¢ Rogers' German Silver.....	60&55	Bissell No. 5.....	\$ dos \$17.00
Williamson's.....	33&40&33&55	First quality, 14, 16 and 20 gauge (\$10 list).....	30&10&25	German Silver.....	60&55	Bissell No. 7 New Drop Pan.....	\$ dos \$19.00
Howe Bros. & Hulbert.....	35	Prize.....	40&25	German Silver, Hall & Elton.....	50&55 cash	Bissell, Grand.....	\$ dos \$36.00
Machine—		Star, Club, Rival and Climax brands.....	33&10&25	Nickel Silver.....	50&55&10&55 cash	Grand Rapids.....	\$ dos \$34.00
Flat Head, Iron.....	55	Seibold's Comb. Shot Shells.....	15&25	Britannia.....	60&10&55	Crown Jewel, No. 1, \$18.00; No. 2, \$19.00; No. 3, \$20.00.....	\$ dos \$24.00
Round Head, Iron.....	50	Brass Shot Shells, 1st quality.....	60&25	Boardman's Nickl Silver, list July 1, 1890.....	60&55 cash	Magie.....	\$ dos \$15.00
Wood—		Brass Shot Shells, Club, Rival, Climax.....	65&25	Boardman's Britannia Spoons, case lots.....	60&55 cash	Jewel.....	\$ dos \$16.00
List January 1, 1891.....	72&45	Shells Loaded—		Springs—		Improved Parlor Queen.....	\$ dos \$27.00
Flat Head Iron.....	67&45	Standard List, July 19, 1890.....	40&10&10	Door—		Nickel.....	\$ dos \$27.00
Round Head Iron.....	67&45	Ship Tools—		Torrey's Rod, regular size.....	\$ dos \$1.30	Janned.....	\$ dos \$24.00
Flat Head Brass.....	72&45	L. & J. White.....	20&55	Gray's, \$ gr., \$20.00.....	20	Excelsior.....	\$ dos \$22.00
Round Head Brass.....	65	Shoes, Horse, Mule, &c.—		Bee Rod \$ gr., \$20.00.....	20	Garland.....	\$ dos \$22.00
Flat Head Bronze.....	72&45	Horse—		Warner's No. 1, \$ dos, \$2.50; No. 2, \$3.30.....	20	Parlor Queen.....	\$ dos \$15.00
Round Head Bronze.....	65	Burden's, Perkins', Phoenix and Bryden's Boss, at factory.....	\$4.00	Gem (Coll), list April 19, 1886.....	10	Housewife's Delight.....	\$ dos \$18.00
Rogers' Drive Screws.....	83&45	Bryden's Frog Pressure, at factory.....	\$5.00	Star (Coll), list April 19, 1886.....	20	Queen.....	\$ dos \$16.00
Scroll Saws—See Saws, Scroll.		Mule—		Victor (Coll).....	60&60&10	Queen, with band.....	\$ dos \$18.00
Scythes.		Add \$1 per keg to above prices.		Champion (Coll).....	60&60&10&10	King.....	\$ dos \$20.00
Grain.....	40&5&40&10	Or, Wrought—		Philadelphia, 5 in., \$5.00; 8 in., \$7.25.....	20	Weed, Improved.....	\$ dos \$18.00
Grass.....	40&10&50	Ten lots.....	\$ dos \$4	Cowell's.....	15.00	Hub.....	\$ dos \$16.00
Scythe Snaths—See Snaths, Scythe Sets.		1000 lb lots.....	\$ dos \$4	15.00.....	60	Cog-Wheel.....	\$ dos \$16.00
Avi and Tool.		500 lb lots.....	\$ dos \$4	Rubber, complete, \$ dos, \$4.50.....	55&10	Easy.....	\$ dos \$22.00
Alken's Sets, Awi and Tools, No. 20, \$10.00.....	55&10	Shot—		Hercules.....	50	Monarch.....	\$ dos \$22.00
Fray's Adj. Tool Hds., No. 1, \$12; 2, \$18; 3, \$12; 4, \$2.....	25&25&10	Drop, up to B, 25-b bag.....	\$1.42	Shaw Door Check and Spring.....	25&30&35	Goshen.....	\$ dos \$21.00
Miller's Falls Adj. Tool Hds., No. 1, \$12; 2, \$18.....	25	Drop, up to B, 5-b bag.....	.35	Carriage, Wagon, &c.—		Ladies' Friend.....	\$ dos \$15.00
Henry's Combination Haft.....	\$ dos \$4.50	Drop, B and larger, 25-b bag.....	1.67	Elliptic, Concord, Platform and Ball.....	60&10&10	Supreme.....	\$ dos \$22.00
Brad Sets, No. 42, \$10.50; No. 43, \$12.50.....	70&10&55	Drop, B and larger 5-b bag.....	.40	Scroll.....	60&10&10	Tacks, Brads, &c.—	
Stanley's Excelsior, No. 1, \$7.50; No. 2, \$4.00; No. 3, \$5.50.....	80&10	Buck and Chilled, 25-b bag.....	1.67	Cliff's Bolster Springs.....	25	List October 19, 1890. Old established standard weights. Short weight goods are sold at lower prices.	
Nail—		Buck and Chilled, 5-b bag.....	.40	Squares—		Carpet Tacks.....	
Square.....	\$ gr., \$4.00&4.35	Dust Shot, 25-b bag.....	2.00	Steel and Iron.....	\$ dos \$0.10&10&10	American, Pined.....	75
Round.....	\$ gr., \$3.35	Dust Shot, 5-b bag.....	.45	Nickel-Plated.....	60&10&10	American, Tin'd and Cop'd.....	75
Buck Probs.....	27&45	Shovels and Spades—		Try Square and T Bevels.....	60&10&60&10	Steel, Bright and Blued.....	72
Cannon's Diamond Point.....	\$ gr., \$12, 20	Amer' Shovels, Spades, &c., list Nov. 1, 1888.....	20	Diaston's Try Square and T Bevels.....	50	Swedes Iron, Blued.....	72
Rivet.		Noters—Jobbers frequently give 5&7% extra on above.....	75	Winterbottom's Try and Miter.....	30&10	Swedes Iron, Tinned.....	75
Regular Hat.....	50&10	Griffith's Black Iron.....	50&10	Starrett's Micrometer Caliper Squares.....	25	American Iron Tacks.....	72
Saw—		Griffith's C. S. Iron.....	60&60&10	Avery's Flush Bevel Squares.....	40	S. S., Blued.....	75
Stillman's Genuine.....	\$ dos \$5.00&7.75, 40&5	Griffith's Solid C. S. R. H. Goods.....	20	Avery's Bevel Protractor.....	50	S. S., Tinned.....	77
Stillman's Imita.....	\$ dos \$3.25&6.25, 40&5	St. Louis Shovel Co.....	20&20&75	Fodder—		Lanc, Blued.....	68
Common Lever.....	\$ dos \$2.00, 40&5	Hussey, Hime & Co.....	15&25	Blair's.....	\$ dos \$2.00	Lanc, Tinned.....	72
Morrill's No. 1, \$15.00; No. 2, \$24.00.....	40&10&50	Hubbard & Co.....	20&75	Blair's "Climax".....	\$ dos \$1.25	Gimp and Lace Tacks—	
Leach's, No. 0, \$3.00; No. 1, \$15.00; No. 2, \$24.00.....	40&10&50	Lehigh Mfg. Co.....	50&10	Lemon—		S. S., Blued.....	75
Nash's.....	80&10&60&10&10	H. M. Myers Co.....	30	Porcelain Lined, No. 1.....	\$ dos \$6.00, 25&30	S. S., Tinned.....	77
Hammer, Hotchkiss.....	\$ dos \$0.50, 10	Payne Pettibone & Son.....	33&45	Wood, No. 2.....	\$ dos \$3.00, 35	Lanc, Blued.....	68
Hammer, Bemis & Call Co's New Pat.....	30&5	Remington's (Lowman's) Pat.....	10&10&40	Wood, Common.....	\$ dos \$1.00&1.75	Lanc, Tinned.....	72
Bemis & Call Co's Lever and Spring Hammer.....	30&55	Rowland's, Black Iron.....	50&10	Dunlap's Improved.....	\$ dos \$3.75, 20	Gimp and Lace Tacks—	
Bemis & Call Co's Plate.....	10	Rowland's Steel.....	60&5&60&10	Sammis.....	No. 1, \$5.00; No. 2, \$3; 12, \$18	S. S., Blued.....	75
Bemis & Call Co's Cross Cut.....	12&45	Shovels and Tongs—		\$18 \$ dos.....	25&10	S. S., Tinned.....	77
Alken's Genuine.....	\$13.00, 50&10	Iron Head.....	60&10&60&10&55	Jennings' Star.....	\$ dos \$2.50	Chair Nails.....	62
Alken's Call Co's.....	\$13.00, 50&10	Brass Head.....	60&10&10	The Boss.....	\$ dos \$2.50	Cigar-Box Nails.....	62
Hart's Pat. Lever.....	\$7.00, 55&55	Staves—		Dean's, No. 1, \$ dos \$5.50; \$2, \$5.35.....	\$1.90; Queen, \$2.50	Tin Tacks.....	60
Diaston's Star.....	25	Mann's Tin Rim.....	50&25	Little Giant.....	50&50&55	Basket and Trimmers' Tacks—	
Leopold.....	40&10&50	Buffalo Metallic, S. S. & Co.....	50&25	King.....	40&55	Lanc.....	65
Atkin's Lever.....	\$ dos No. 1, \$6.00	Shaker (Barber's) Pat. Flour Sifters.....	\$ dos \$2.00; \$ gr \$21.00	Hotchkiss Straight Flash.....	\$ dos \$12.00	S. S.....	70
Atkin's Criterion.....	\$ dos No. 1, \$6.00	Electric.....	\$ gr \$21.00	Silver & Co., Glass.....	\$ gr \$9.00	Hungarian Nails.....	68
Croissant (Keller), No. 1, \$15.00; No. 2, \$24.00.....	40&10	A. & W. Sifters.....	\$ gr \$21.00	Manny Lemon Juice Extractor.....	\$ dos \$7.00	Miner's Tacks.....	70
Avery's Saw Set and Punch.....	\$ dos \$7.00	Hunter's.....	\$ dos \$2.00	Standard.....	\$ dos \$0.75&1.00	Common and Patent Brads.....	68
Chieftain Co's Superior.....	\$ dos \$7.00	Smith's Adjustable Sifters.....	\$ dos \$2.00	Improved.....	\$ dos \$2.00	Leathered Tacks.....	68
Chieftain Co's Royal.....	\$ dos \$7.50	Smith's Adjustable Milk Strainer.....	\$ dos \$2.00	Standard Fiber Ware—See Ware, Standard Fiber.		Brush Tacks.....	50
Crescent.....	\$ dos \$7.50	Smith's Adjustable T. & C. Strainer.....	\$				

